PRACTICE & REVISION KIT

CA SRI LANKA CURRICULUM 2020

Corporate level
CL3 – Advanced Management Accounting

THE INSTITUTE OF
CHARTERED ACCOUNTANTS OF SRI LANKA

Second edition 2020

ISBN 9781 4727 1044 4

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Published by

BPP Learning Media Ltd
BPP House, Aldine Place
142-144 Uxbridge Road
London W12 8AA

www.bpp.com/learningmedia

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Introduction

Welcome to this Practice & Revision Kit for the Institute of Chartered Accountants of Sri Lanka professional examinations for curriculum 2020.

One of the key criteria for achieving exam success is question practice. There is generally a direct correlation between candidates who revise all topics and practise exam questions and those who are successful in their real exams. This Practice & Revision Kit gives you ample opportunity for such practice in the run up to your exams.

The Practice & Revision Kit is structured to follow the modules of the Study Text, and comprises banks of non-complex mini scenario and functional scenario questions as appropriate. Suggested solutions to all questions are supplied.

We welcome your feedback. If you have any comments about this Practice & Revision Kit, or would like to suggest areas for improvement, please email learningdevelopment@casrilanka.org.

Good luck in your exams!

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How to use this Practice & Revision Kit

This Practice & Revision Kit comprises banks of practice questions, mostly in the style that you will encounter in your exam. It is the ideal tool to use during the revision phase of your studies.

Questions in your exam may test any part of the syllabus so you must **revise the whole syllabus**. Selective revision will limit the number of questions you can answer and hence reduce your chances of passing. It is better to go into the exam knowing a reasonable amount about most of the syllabus rather than concentrating on a few topics to the exclusion of the rest. You should at all costs avoid falling into the trap of question spotting, that is trying to predict what are likely to be popular areas for questions, and restricting your revision and question practice to those.

Practising as many exam-style questions as possible will be the key to passing this exam. You must do exam-style questions under **timed conditions** and ensure you write full answers to the discussion parts as well as doing the calculations.

Planning your revision

When you begin your course, you should make a plan of how you will manage your studies, taking into account the volume of work that you need to do and your other commitments, both work and domestic.

In this time, you should go through your notes to ensure that you are happy with all areas of the syllabus and practise as many questions as you can. You can do this in different ways, for example:

- Revise the subject matter a module at a time and then attempt the questions relating to that module; or
- Revise all the modules and then build an exam out of the questions in this Practice & Revision Kit.

Using the practice questions

The best approach is to select a question and then allocate to it the appropriate time, based on the real exam. All the questions in this Practice & Revision Kit have mark allocations, so you can calculate the amount of time that you should spend on the question.

Using the suggested solutions

Avoid looking at the answer until you have finished a question. It can be very tempting to do so, but unless you give the question a proper attempt under exam conditions you will not know how you would have coped with it in the real exam scenario.

When you do look at the answer, compare it with your own and give some thought to why your answer was different, if it was.

If you did not reach the correct answer make sure that you work through the explanation or workings provided, to see where you went wrong. If you think that you do not understand the principle involved, go back to your own notes or your study materials and work through and revise the point again, to ensure that you will understand it if it occurs in the exam.

Our suggested solutions are comprehensive, but in some discursive questions it may be that you have made points that are not included in the suggested solution that are equally valid. In the real exams you should be given credit for such points.

Format of the exam

Mode:	Paper based examination
Open books:	Financial Reporting (CAS0205), Corporate Law (CAS0405)
Time:	3 hours
Pass Mark:	50%

The exam comprises of three sections, as follows:

Section 1

Total 20 marks; Ten (10) multiple choice, fill in the blanks, Matching questions, etc. of two marks each (including scenario based questions)

Section 2

Total 40 marks: Four (4) questions of ten (10) marks each based on mini scenario leading to non-complex applications and analysis.

Section 3

Total 40 marks: Two (2) questions of twenty (20) marks, each questions on complex scenario based analysis and applications.

Exam techniques

Using the right techniques in the real exam can make all the difference between success and failure.

Here are a few pointers:

1. During the 20-minute reading time at the start, read through the questions and **decide in what order you are going to attempt the exam.** You have to write your answers in the order set out in the question and answer booklet, but you can attempt the questions in any order that you like.

   Some candidates like to attempt the easiest questions first, on the basis that will enable them to gain the easiest available marks quickly, and build up their confidence.

   If you select a question on a topic area about which you feel confident, and do that first, you will build up your confidence right at the start, which will help to calm you if you are nervous and set the tone for the rest of the exam. You should decide what approach is best for you.

2. Having established the order that you are going to do the exam, **allocate the time available to the questions** and work out at what time you will need to stop working on one question and move on to the next. When you reach the end of the allocated time for the question that you are working on, **STOP**. It is much easier to gain the straightforward marks for the next question than to spend a long time working on the previous question in the hope of gaining one or two final marks.

3. **Read the question**. Read it carefully once, and then read it again to ensure that you have picked everything up. Make sure that you understand what the question wants you to do, rather than what you might like the question to be asking you.

4. **Answer all parts of the question**. Even if you cannot do all of the calculation elements, you will still be able to gain marks in the discussion parts.

5. Don't worry if you think that you have made a mistake in a computational part of a question. You will not earn the mark for that particular part, but you will still be able to gain credit for correct application in the later parts of the question, even if you are using the wrong figure.

6. When starting to read a question, especially a long case study, **read the requirement first**. You will then find yourself considering the requirement as you read the data in the scenario, helping you to focus on exactly what you have to do.

7. **Plan your answer** before you start to write your response, especially for longer case studies. This will help you to focus on the requirements of the question and to avoid irrelevance.

8. Try to make sure that **your answer relates to the specifics of the question** itself. If you are asked to consider the impact of the scenario on someone named in the question, make sure that you do that, so your answer is as relevant as possible.

9. If you finish the exam with time to spare, use the rest of the time to review your answers and to make sure that you answered every requirement of every question.

Action verbs checklist

Knowledge Process	Verb List	Verb Definitions
Tier - 1 Remember Recall important information	**Define**	Describe exactly the nature, scope or meaning
	Draw	Produce (a picture or diagram)
	Identify	Recognise, establish or select after consideration
	List	Write the connected items one below the other
	Relate	To establish logical or causal connections
	State	Express something definitely or clearly
Tier - 2 Comprehension Explain important information	**Calculate/Compute**	Make a mathematical computation
	Discuss	Examine in detail by argument showing different aspects, for the purpose of arriving at a conclusion
	Explain	Make a clear description in detail revealing relevant facts
	Interpret	Present in understandable terms or to translate
	Recognise	To show validity or otherwise, using knowledge or contextual experience
	Record	Enter relevant entries in detail
	Summarise	Give a brief statement of the main points (in facts or figures)
	Classify	Allocate into categories
	Describe	Communicate the key features
	Provide	Give illustrations to support or illuminate a point or assertion
Tier - 3 Application Use knowledge in a setting other than the one in which it was learned/solve close-ended problems	**Apply**	Put to practical use
	Assess	Determine the value, nature, ability or quality
	Demonstrate	Prove, especially with examples
	Graph	Represent by means of a graph
	Prepare	Make ready for a particular purpose
	Prioritise	Arrange or do in order of importance
	Reconcile	Make consistent with another
	Solve	To find a solution through calculations and/ or explanations

Knowledge Process	Verb List	Verb Definitions
	Conduct	Organize and carry out a task
	Communicate	Transmit thoughts or knowledge
	Display	Make evident or noticeable
	Perform	Do or execute, usually in the sense of a complex procedure
	Reconcile	Make or prove consistent or compatible or show differences
	Set	Fix or establish
	Select	Choose from a range of options or possibilities
	Support	Assist to make decisions by providing appropriate information about respective concepts
	Use	Apply in a practical way
	Undertake	Commit to do or perform
Tier - 4 Analysis Draw relations among ideas and to compare and contrast/solve open-ended problems	**Analyse**	Examine in detail in order to determine the solution or outcome
	Compare	Examine for the purpose of discovering similarities
	Contrast	Examine in order to show unlikeness or differences
	Construct	Build or make a diagram, model or formula
	Differentiate	Constitute a difference that distinguishes something
	Outline	Make a summary of significant features
	Write	Provide word descriptions to express an opinion or idea
Tier - 5 Evaluate Formation of judgments and decisions about the value of methods, ideas, people or products	**Advise**	Offer suggestions about the best course of action in a manner suited to the recipient
	Convince	To persuade others to believe something using evidence and/or argument
	Criticise	Form and express a judgment
	Comment	Provide written remarks expressing an opinion in both positive and negative perspectives
	Evaluate	To determine the significance by careful appraisal
	Conclude	Form a judgment about, or determine or resolve the outcome of, an issue through a process involving reasoning
	Determine	Ascertain or conclude after analysis and consideration; judge

Knowledge Process	Verb List	Verb Definitions
	Justify	Give valid reasons or evidence for
	Review	Study critically with a view to correction or improvement
	Recommend	A suggestion or proposal as to the best course of action
	Resolve	Settle or find a solution to a problem or contentious matter
	Validate	Check or prove the accuracy
Tier - 6 Synthesis Solve unfamiliar problems by combining different aspects to form a unique or novel solution	**Compile**	Produce by assembling information collected from various sources
	Design	Devise the form or structure according to a plan
	Develop	To disclose, discover, perfect or unfold a plan or idea
	Propose	To form or declare a plan or intention for consideration or adoption
	Anticipate	Foresee, or experience or realise beforehand
	Draft	Write original material for the scrutiny of others
	Formulate	Devise and put into words
	Plan	Devise the plan for an assurance engagement
	Report	Give the formal final conclusion for an assurance engagement
	Submit	Send a completed document to a particular party
	Suggest	Put forward an idea or give reasons
	Synthesize	Make or propose a new concepts or ideas by combining existing knowledge in different aspects

Learning outcomes

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
A. Cost Management: 20%	**1.1 Modern manufacturing environment**	1.1.1 Identify the drivers of change in the modern manufacturing environment.	Changes in the modern manufacturing environment.	**46, 47, 71, 74, 82**
		1.1.2 Discuss the concept of just-in-time and the impact of just-in-time in a modern organisation.	• Just-in-time vs Just in case. • Philosophy of Just-in-time. • Advantage and disadvantages of just-in-time.	**10, 71, 74, 82**
	1.1 Modern manufacturing environment	1.1.3 Discuss the importance of quality costing as a part of total quality management.	Principles of total quality management and the supporting concepts such as lean manufacturing, six sigma, kaizen.	**10, 72, 74**
		1.1.4 Apply throughput accounting principles for profit reporting and inventory valuation.	Theory of constraints & throughput accounting. Classification of quality costs into prevention costs, appraisal costs, internal failure costs and external failure costs. Compute the 'optimum product mix' when there are bottleneck resources.	**12, 72, 98, 99**
		1.1.5 Discuss the pros and cons of backflush costing.	Backflush costing.	**65**
		1.1.6 Discuss the evolution of resource planning and management systems.	Evolution of Systems (MRP I, MRP II, ERP I, ERP II).	

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
	1.2 Activity based costing	1.2.1 Discuss the emergence of activity based costing (ABC) system.	Emergence of ABC in modern environment.	**3, 4, 9, 11, 13, 73, 76, 120**
		1.2.2 Discuss the pros and cons of ABC system with traditional marginal and absorption costing systems.	Product and service costing using ABC. Advantages and disadvantages of ABC system compared against traditional costing systems.	**3, 4, 73**
		1.2.3 Review stages in designing ABC system & activity hierarchy.	Designing process and practical limitations for implementations.	**73, 76**
		1.2.4 Apply time-driven ABC method.	Time-driven ABC method as a solution for limitations in traditional ABC system.	
		1.2.5 Discuss the use of ABC system as resource consumption model.	Costs of resources supplied, costs of resources used and cost of unused capacity.	**73**
		1.2.6 Evaluate the importance of activity based management.	Activity based management.	**61-70, 120**
	1.3 Strategic cost management & value creation	1.3.1 Discuss the value creation processes in organisation to enhance long term profits.	• Value chain analysis, • Basics of supply chain management. • Target costing approach and limitations. • Life cycle costing and its implications for marketing strategies. • Business process re-engineering and elimination on non-value adding activities and reduction of activity costs.	**1, 7, 14, 75, 81, 83, 114**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
		1.3.2 Analyse direct customer profitability and distribution channel profitability.	Customer & channel profitability analysis.	**113, 114**
		1.3.3 Apply learning curves to estimate time and cost for activities, products and services.	Learning curve & its use in predicting product/service costs, including derivation of the learning rate and learning index.	**36, 43, 77**
	1.4 Environmental aspects of cost management	1.4.1 Differentiate conventional management accounting from environmental management accounting (EMA).	Definitions of environmental costs (using quality costing framework) and benefits. Implications of EMA to product pricing, budgeting, decision making etc. Difficulties in measuring environmental costs and their impact on external environment.	**2, 5, 6, 99**
		1.4.2 Discuss different frameworks developed for EMA.	Popular contemporary frameworks developed by researchers.	**2, 5, 6, 99**
		1.4.3 Apply different techniques/tools used to identify environmental impact of an organisation.	Tools/methods for identification such as input/output analysis, process flow charts, environmental activity based costing.	**2, 5, 6, 99**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
B. Planning & Controlling: 25%	**2.1 Standard costing & variance analysis**	2.1.1 Compute basic variances under absorption costing & marginal costing systems.	Basic variances under absorption costing & marginal costing: • Material/labour/variable overhead (rate & efficiency). • Fixed overhead – expenditure & volume (split of capacity & efficiency). • Sales: Price & sales volume (contribution/profit).	**31, 77, 79, 100, 101**
		2.1.2 Prepare variance accounts.	Accounting for variances in the integrated accounting system.	
		2.1.3 Interpret performance differences and inter-relationships between variances.	Interpretation of variances. Interrelationship between variances.	**100, 101**
		2.1.4 Analyse the usage/efficiency/volume variances by subdividing the total into mix & yield/quantity variances.	Split material usage and labour efficiency variances into mix & yield variances. Split sales volume (contribution/profit) variance into sales mix & sales quantity variances.	**30, 34, 37, 38, 39, 40, 79, 101**
		2.1.5 Analyse the variances in planning and operational variances when standards are revised.	Planning and operational variances and its purpose.	**27, 42, 79, 101**
		2.1.6 Prepare a statement that reconciles budgeted profit with the actual profit calculated using absorption costing/marginal costing.	The use of variances to reconcile the budgeted and actual profits that have been calculated using absorption/marginal costing.	**100**
		2.1.7 Discuss the importance of investigating variances.	Variance investigation – factors & tools, percentage variance.	**78, 97, 100**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
		2.1.8 Evaluate the applicability of standard costing in modern business environment.	Advantages of standard costing, disadvantages of standard costing/criticisms in modern environment. Standardisation in a service environment. Applicability of benchmarking vs standard costing.	**25, 26, 97**
	2.2 Capacity planning	2.2.1 Evaluate different measures of capacity and utilisation.	Measuring design capacity, effective capacity, utilisation & efficiency.	
		2.2.2 Discuss demand management strategies.	When demand exceeds capacity, when capacity exceeds demand, seasonal demand.	
		2.2.3 Apply short-term capacity modifying strategies.	Changing inventory levels, varying workforce, overtime or idle time, subcontracting.	**119**
		2.2.4 Apply long-term capacity planning options and evaluation tools.	Leading demand (incremental expansion, one-step expansion), capacity lags with demand (incremental expansion), average capacity with incremental expansion, evaluation tools including NPV, ROI & decisions trees (illustrations only).	**87**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
	2.3 Budgeting	2.3.1 Explain the purposes of budgeting and their conflicts.	Purposes of budgeting (planning, controlling, coordination & communication, motivation, authorisation and performance evaluation) & their conflicts.	**28, 29, 33, 75, 103**
		2.3.2 Discuss the alternative approaches to budgeting.	Alternative approaches to budgeting: • Top down vs bottom up (participative budgeting) • Incremental vs zero based • Periodic vs rolling • Activity based budgeting	**32, 35, 44, 45, 102, 103**
		2.3.3 Discuss the relevance of non-financial indicators in performance measurement.	Balance scorecard.	**56, 57, 61-70**
		2.3.4 Outline behavioural issues in budgeting.	Behavioural issues in budgeting.	**41, 61-70, 80, 102**
		2.3.5 Differentiate traditional budgeting from beyond budgeting.	Beyond budgeting and its application to private and public entities. Arguments for and against beyond budgeting.	**78, 102**
		2.3.6 Discuss how business analytics supplement traditional budgeting and planning with forecasts and predictions.	Statistical modelling and big data mining for forecasting and budgeting.	

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
	2.4 Performance measurement: Responsibility centres	2.4.1 Evaluate the performance of the divisions of a decentralised organisation.	Responsibility centres; Revenue, cost, profit and investment centres & performance metrics (profitability, liquidity & asset management ratios, return on investment, residual income, economic value added etc).	**50, 51, 52, 53, 58, 70, 71, 92, 105**
		2.4.2 Discuss the behavioural implications of divisional performance measures.	Behavioural consequences of responsibility centre performance management.	**89, 91, 92, 105**
	2.5 Performance measurement: Transfer pricing	2.5.1 Discuss transfer pricing methods.	The theory of transfer pricing, including perfect, imperfect and no market for intermediate good. Transfer pricing methods; Maximum and minimum price, cost based transfer pricing, market based transfer pricing, negotiated pricing, dual pricing and lump sum payments as means of addressing some issues.	**48, 49, 55, 89, 90, 109, 110**
		2.5.2 Evaluate the behavioural effects of transfer pricing.	Effects of transfer pricing (motivation, autonomy of individual divisions, sub optimal decisions; divisional and group profitability).	**59, 89, 90, 109, 110**
C. Decision Making: 30%	**3.1 Optimising with multiple limiting factors**	3.1.1 Apply graphical method for optimising with multiple limiting factors.	Profit maximisation or cost minimisation problems with graphical approach, constraints & shadow price.	**22, 23, 61-70, 85, 104**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
		3.1.2 Formulate the initial linear programming model using simplex method and interpret the final linear programming model.	Linear programming with simplex method (only initial model development and interpreting the final solution).	**23, 23, 85, 86**
		3.1.3 Apply BEP for multiple products.	Multi product break-even analysis computations & charts.	**61-70, 118**
	3.2 Relevant costing for short-term decisions	3.2.1 Apply relevant cost concept for short-term decision making.	• Make or buy decisions • Shut down decisions • Special pricing decisions • Further processing decisions	**16, 17, 61-70, 88, 107, 118**
	3.3 Long-term decision making; advanced investment appraisal	3.3.1 Evaluate projects with tax implications.	Incorporating tax into the discount rate and cash flows.	**108**
		3.3.2 Apply monetary method and real method to incorporate the impact of inflation in project appraisals.	Inflation; monetary method and real method.	**108**
		3.3.3 Evaluate projects with unequal life cycles such as assets replacements.	Unequal life (annual equivalent method, least common multiple method). Assets replacement decisions.	**116**
		3.3.4 Evaluate projects with a capital rationing situation.	Prioritisation of projects subject to single period capital rationing using: • Profitability index for divisible projects. • Combined NPV method for indivisible projects.	**116**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
		3.3.5 Discuss the strengths & weaknesses of investment appraisal techniques.	Strengths and weaknesses of accounting rate of return, payback, net present value, internal rate of return. Modified IRR as a solution for drawbacks of IRR (concept of terminal value).	**117**
		3.3.6 Assess non-financial factors for projects evaluation.	Environmental, social and political aspects of projects.	**108**
		3.3.7 Review project's results through post completion audit.	Post completion audit. Project abandonment decisions.	**61-70**
		3.3.8 Discuss public/social project evaluation techniques (concepts only. No calculations expected).	Economic Net Present Value (ENPV), Economic Internal Rate of Return (EIRR), Shadow Pricing of Economic Costs and Benefits, Social Costs & Benefits.	
	3.4 Pricing decisions	3.4.1 Apply marginal approach to arrive at optimum selling price & quantity.	Optimum selling price & quantity for firms in perfect competition, oligopoly, monopoly & monopolistic competition.	**15, 83, 97**
		3.4.2 Apply price elasticity of demand for pricing.	Application of price elasticity of demand for perfect/imperfect competition.	**19**
		3.4.3 Discuss different market based pricing strategies and their consequences.	Market penetration, market skimming, premium pricing, loss leader, bundling, product differentiation, price discrimination.	**20**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
	3.5 Big data for decision making	3.5.1 Discuss the implications of big data for operational & strategic decision making.	Business analytics for data driven decisions at operational and strategic decision making.	**115**
		3.5.2 Evaluate the benefits & costs of big data for an organisation.	Benefits & costs of big data.	**115**
D. Risk & Uncertainty: 15%	**4.1 Decision tree**	4.1.1 Apply probability in decision trees for multi stage decision problems.	• Decision tree. • Value of perfect and imperfect information.	**106**
	4.2 Investment appraisal with risk	4.2.1 Evaluate projects under risk considerations.	Risk adjustment; certainty equivalent, risk adjusted discount rate.	**18, 21, 84, 106**
		4.2.2 Review results of appraisal with sensitivity analysis.	Sensitivity analysis in project appraisals.	**24, 106, 108**
		4.2.3 Draw conclusions with Monte Carlo simulation.	Monte Carlo simulation.	**117**
		4.2.4 Discuss downside risks in projects.	Downside risks (Value at Risk) in projects.	**117**
	4.3 Risk management	4.3.1 Review the risk management process of an organisation.	Overview of risk management process.	**117**
		4.3.2 Apply TARA framework for a given scenario.	TARA framework (Transfer, Avoidance, Reduction & Acceptance of Risks).	**117**
E. Working Capital Management: 10%	**5.1 Managing working capital**	5.1.1 Illustrate the concepts relating to working capital management.	Gross working capital, net working capital, working capital management, working capital policy.	**93, 111**
		5.1.2 Discuss working capital investment and financing policies.	Working capital investment & financing policies: Conservative, moderate & aggressive.	**93, 111, 112**

Syllabus Area	Knowledge Component	Learning Outcomes	Specific Knowledge	Question
		5.1.3 Analyse the impact of working capital cycle to a firm operating in trading/manufacturing/service sectors.	Working capital cycle with key ratios, strategies for improvement, overtrading.	**93, 112**
	5.2 Receivables & payables management	5.2.1 Recommend the strategies for managing receivables & payables.	Receivable & payable management strategies: • Credit control: credit policy, collection process, age analysis. • Settlement discounts. • Factoring of receivables. • Payment methods.	**96, 111, 112**
	5.3 Inventory management	5.3.1 Evaluate the impact to the economic order quantity when discounts are available.	EOQ calculation with quantity discounts.	**82, 93, 94**
		5.3.2 Discuss the use of ABC classification, JIT arrangements for inventory management.	ABC classification for inventory management, cost of stocks & JIT arrangements.	**82, 94**
	5.4 Cash/treasury management	5.4.1 Discuss the importance of cash management.	Motives to hold cash, concept of float, cash flow synchronisation.	**93**
		5.4.2 Evaluate short-term sources of finances.	Sources of short-term financing, import/export financing.	**95**
		5.4.3 Evaluate short-term investment strategies.	Short-term investments: • Active & passive investment strategies. • Criteria (maturity, risk, return, liquidity, diversity). • Types of instruments. • Treasury bill & bond pricing.	**95**

Questions

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SECTION 1: OBJECTIVE TEST QUESTIONS

Questions 1 to 70 covers **objective test questions from across the syllabus. All questions are worth two marks**

1 The following costs have arisen in relation to the production of a product:

(i) Planning and concept design costs
(ii) Testing costs
(iii) Production costs
(iv) Distribution and customer service costs

In calculating the life cycle costs of a product, which of the above items would be included?

- (iii) only
- (i), (ii) and (iii)
- (i), (ii) and (iv)
- All of the above

(LO 1.3.1)

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2 Are the following statements about environmental management accounting true or false?

A system of environmental management accounting provides environmental information for internal use by management, but not for external reporting.	**TRUE**	**FALSE**
Environmental management accounting systems typically make use of life cycle costing.	**TRUE**	**FALSE**

(LO 1.4.1–3)

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3 Which of the following statements about activity based costing is true?

- The cost driver for quality inspection is likely to be batch size.
- The cost driver for materials handling and despatch costs is likely to be the number of orders handled.
- In the short run, all the overhead costs for an activity vary with the amount of the cost driver for the activity.
- A cost driver is an activity based cost.

(LO 1.2.1–6)

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4 Which **TWO** of the following statements about activity based costing (ABC) are true?

- ☐ Implementation of ABC is unlikely to be cost effective when variable production costs are a low proportion of total production costs.
- ☐ In a system of ABC, for costs that vary with production levels, the most suitable cost driver is likely to be direct labour hours or machine hours.
- ☐ Activity based costs are the same as relevant costs for the purpose of short-run decision making.
- ☐ Activity based costing is a form of absorption costing.

(LO 1.2.1–6)

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5 In environmental costing, the future cost of cleaning up operations for a product or activity may be classified as which of the following?

- ○ Carbon footprint
- ○ Contingent cost
- ○ Hidden cost
- ○ Relationship cost

(LO 1.4.1–3)

---

6 Are the following statements about environmental cost accounting true or false?

The majority of environmental costs are already captured within a typical organisation's accounting system. The difficulty lies in identifying them.	**TRUE**	**FALSE**
Input/output analysis divides material flows within an organisation into three categories: material flows; system flows; and delivery and disposal flows.	**TRUE**	**FALSE**

(LO 1.4.1–3)

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7 Which of the following statements about target costing is **NOT** true?

- ○ Target costing is better suited to assembly orientated industries than service industries that have a large fixed cost base.
- ○ Costs may be reduced in target costing by removing product features that do not add value.
- ○ A target cost gap is the difference between the target cost for a product and its projected cost.
- ○ Products should be discontinued if there is a target cost gap.

(LO 1.3.1)

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8 Which of the following should be categorised as environmental failure costs by an airline company?

(i) Compensation payments to residents living close to airports for noise pollution caused by their aircraft

(ii) Air pollution due to the airline's carbon emissions from their aircraft engines

(iii) Penalties paid by the airline to the government for breaching environmental regulations

- ○ (ii) only
- ○ (i), (ii) and (iii)
- ○ (i) and (iii)
- ○ (ii) and (iii)

(LO 1.4.1–3)

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9 Which **TWO** of the following statements about activity based costing (ABC) are true?

- ☐ ABC recognises the complexity of modern manufacturing by the use of multiple cost drivers.
- ☐ ABC establishes separate cost pools for support activities.
- ☐ ABC reapportions support activity costs.
- ☐ ABC is an appropriate costing system when overheads vary with time spent on production.

(LO 1.2.1–6)

---

10 Which **TWO** of the following costs are likely to rise when just-in-time (JIT) manufacturing is introduced?

- ☐ Set-up costs
- ☐ Raw material handling costs
- ☐ Raw material storage costs
- ☐ Customer order costs

(LO 1.1.2)

---

11 If Triple LLC decides to adopt ABC, which of the following is a disadvantage that Triple LLC may encounter as a result of this decision?

- ○ ABC can only be applied to production overheads.
- ○ The cost per unit may not be as accurate as it was under traditional absorption costing.
- ○ The benefits obtained from ABC might not justify the costs.
- ○ It will not provide much insight into what drives overhead costs.

(LO 1.2.1–6)

---

12 Yam Llc is involved in the processing of sheet metal into products A, B and C using three processes: pressing, stretching and rolling. The factory has many production lines, each of which contains the three processes. Raw material for the sheet metal is first pressed, then stretched and finally rolled. The processing capacity varies for each process and the factory manager has provided the following data:

	Processing time per metre in hours		
	Product A	*Product B*	*Product C*
Pressing	0.50	0.50	0.40

The total annual processing hours for the factory is 225,000. On average, one hour of labour is needed for each of the 225,000 hours of factory time. Labour is paid Rs. 10 per hour.

The raw materials cost per metre is Rs. 2.50 for product B. Other factory costs (excluding labour and raw materials) are Rs. 18,000,000 per year. Selling prices per metre are Rs. 60 for product B. The return per factory hour of product A is Rs. 134.

Yam carries very little inventory. Pressing has been identified as the bottleneck.

What is the maximum output capacity per year for the bottleneck 'pressing' for each product?

Product A

[ ] Metres

Product B

[ ] Metres

Product C

[ ] Metres

(LO 1.1.4)

---

13 Ivey LLC uses ABC costing. Are the following statements true or false?

(1) Ivey LLC uses an expensive costing system

(2) Ivey LLC's costing system is quicker to use than traditional absorption costing

- ○ Both statements are true
- ○ Both statements are false
- ○ Statement 1 is true and statement 2 is false
- ○ Statement 1 is false and statement 2 is true

(LO 1.2.1–6)

---

14 In an industry with advanced technology when would the bulk of a product's life cycle cost normally be determined?

- ○ At the design and development stage
- ○ On disposal
- ○ When the product is introduced to the market
- ○ When the product is in its growth stage

(LO 1.3.1)

---

15 The following statements have been made about cost plus pricing.

(1) A price in excess of full cost per unit will ensure that a company will cover all its costs and make a profit.

(2) Cost plus pricing is an appropriate pricing strategy when jobs are carried out to customer specifications.

Which of the above statements is/are true?

- ○ Statement 1
- ○ Statement 2
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 3.4.1–3)

---

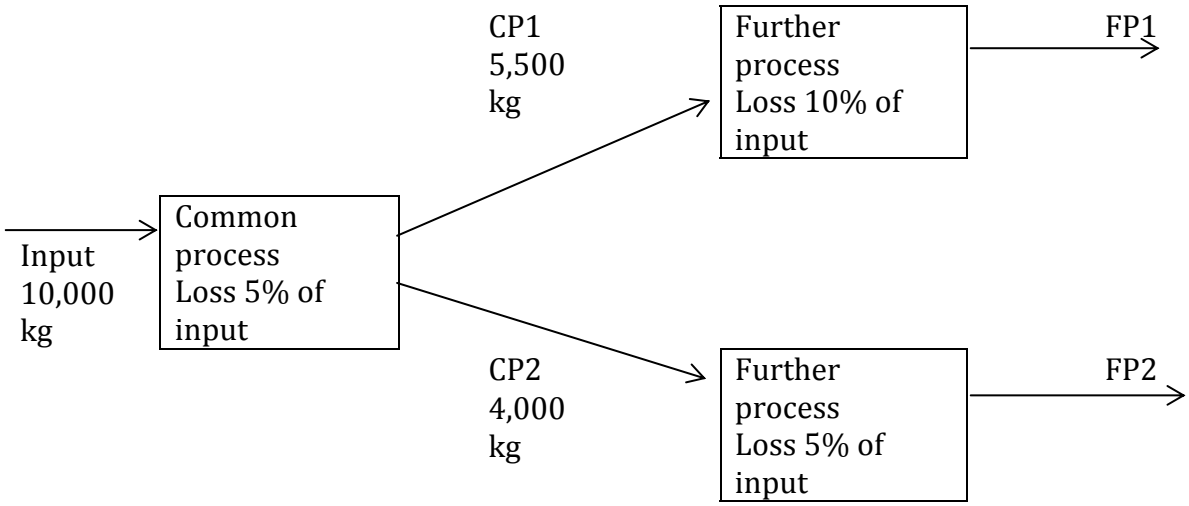
16 A benefit sacrificed by taking one course of action instead of the most profitable alternative course of action is known as which of the following?

Select...
Opportunity cost
Incremental cost
Relevant cost
Sunk cost

(LO 3.2.1)

---

17 A manufacturing company makes two joint products, CP1 and CP2, in a common process. These products can be sold at the split-off point in an external market, or processed further in separate processes to produce products FP1 and FP2. Details of these processes are shown in the diagram.



CP1 has a market price of Rs. 6,000 per kg and CP2 has a market price of Rs. 5,000 per kg. Relevant further processing costs are Rs. 2,000 per input kg in the process to make FP1 and Rs. 3,000 per input kg in the process to make FP2. Both FP1 and FP2 sell for Rs. 9,000 per kg.

For each 10,000 kg input to the common process, how much additional profit is obtained by further processing each of the joint products instead of selling them at the split-off point?

- ○ Rs. 2.75 million
- ○ Rs. 4.45 million
- ○ Rs. 8.75 million
- ○ Rs. 9.5 million

(LO 3.2.1)

---

18 Analysing the range of different possible outcomes from a particular situation, with a computer model that uses random numbers, is known as which of the following?

- ○ Probability analysis
- ○ Sensitivity analysis
- ○ Simulation modelling
- ○ Stress testing

(LO 4.2.1–4)

---

19 If the price elasticity of demand is zero, which **TWO** of the following are true?

- ☐ Demand is 'perfectly inelastic'.
- ☐ There is no change in price regardless of the quantity demanded.
- ☐ The demand curve is a horizontal straight line.
- ☐ There is no change in the quantity demanded, regardless of any change in price.

(LO 3.4.2)

---

20 Which method of pricing is most easily applied when two or more markets for the product or service can be kept entirely separate from each other?

- ○ Price discrimination
- ○ Product line pricing
- ○ Skimming
- ○ Volume discounting

(LO 3.4.3)

---

21 What method of uncertainty or risk analysis is also called 'What if?' analysis?

Select... ▼
Decision tree analysis
Sensitivity analysis
Simulation modelling
Stress testing

(LO 4.1.1–4)

---

22 In a linear programming problem to determine the contribution-maximising production and sales volumes for two products, X and Y, the following information is available.

	Product X per unit	*Product Y per unit*	*Total available per period*
Direct labour hours	2 hours	4 hours	10,000 hours
Material X	4 kg	2 kg	14,000 kg
Contribution per unit	Rs. 12,000	Rs. 18,000	

The profit-maximising level of output and sales is 3,000 units of Product X and 1,000 units of Product Y.

What is the shadow price of a direct labour hour?

- ○ Rs. 1,000
- ○ Rs. 2,400
- ○ Rs. 4,000
- ○ Rs. 4,500

(LO 3.1.1–2)

---

23 Which **TWO** statements are true when using linear programming to solve production problems?

- ☐ If the aim is to minimise costs, the solution is where the total cost line touching the feasible area at a tangent is as far away from the origin as possible.
- ☐ If the aim is to minimise costs, the solution is where the total cost line touching the feasible area at a tangent is as close to the origin as possible.
- ☐ If the aim is to maximise profit, the solution is where the total cost line touching the feasible area at a tangent is as far away from the origin as possible.
- ☐ If the aim is to maximise profit, the solution is where the total contribution line touching the feasible area at a tangent is as close to the origin as possible.
- ☐ If the aim is to maximise profit, the solution is where the total contribution line touching the feasible area at a tangent is as far away from the origin as possible.

(LO 3.1.1–3.1.2)

---

24 Which **TWO** of the following reduce uncertainty in decision making?

- ☐ Expected value analysis
- ☐ Market research
- ☐ Focus groups
- ☐ Relevant costing

(LO 4.2.1–4.3.2)

---

25 Which of the following is the **LEAST** likely reason why standard costs might be difficult to apply to road haulage and distribution services?

- ○ It is difficult to measure labour times reliably
- ○ Variable costs are negligible
- ○ It is difficult to identify a standard item for costing
- ○ Standard costing applies to manufacturing industries only

(LO 2.1.8)

---

26 Which **TWO** of the following statements correctly describe an attainable standard?

- ☐ This standard is the least useful and most rarely used type of standard.
- ☐ This standard makes allowances for expected wastage and inefficiencies.
- ☐ This standard is based on perfect operating conditions.
- ☐ This standard should give employees a realistic, but challenging target of efficiency

(LO 2.1.8)

---

27 For which of the following variances should a production manager usually be held responsible?

- ○ Material price planning variance
- ○ Material price operational variance
- ○ Material usage planning variance
- ○ Material usage operational variance

(LO 2.1.5)

---

28 The following statements have been made about flexible budgets.

(1) Flexible budgets enable proper comparisons to be made between actual and expected revenues and costs.

(2) In every variance reporting system with flexible budgets that compares budgeted and actual profit, there must be a sales volume variance.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.3.1)

---

29 Which **TWO** of the following are arguments that variance analysis from a standard costing system is redundant in a total quality management environment with continuous improvement?

- ☐ For standard costing to be useful for control purposes, it requires a reasonably stable environment.
- ☐ The ethos behind a system of standard costing is that performance is satisfactory if it meets predetermined standards.
- ☐ The control aspect of standard costing systems is achieved by making managers responsible for the variances relating to their part of the organisation's activities.
- ☐ Standard costs are set based on ideal standards rather than attainable ones.

(LO 2.3.1)

---

30 The following statements have been made about standard mix and yield variances.

(1) Mix and yield variances enable management to resolve problems with the quality of production output.

(2) Persistent adverse mix variances may have an adverse effect on sales volume variances and direct labour efficiency variances.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.1.4)

---

31 A company makes and sells three products. Budgeted and actual results for the period just ended were as follows.

Product	*Budgeted sales*	*Budgeted profit per unit*	*Actual sales*	*Actual profit per unit*
	Units	Rs	Units	Rs
X	800	10,000	700	8,000
Y	1,000	6,000	1,200	6,000
Z	600	12,000	350	16,000
	2,400		2,250	

What was the adverse sales quantity variance?

Rs. ☐

(LO 2.1.1)

---

32 Are the following statements about zero-based budgeting true or false?

Employees will focus on eliminating wasteful expenditure.	**TRUE**	**FALSE**
Short-term benefits could be emphasised over long-term benefits.	**TRUE**	**FALSE**

(LO 2.3.2)

33 Total production costs for 900 units of output are Rs. 58,200,000 and total production costs for 1,200 units are Rs. 66,600,000.

The variable cost per unit is constant up to a production level of 2,000 units per month, but a step up of Rs. 6 million in the monthly total fixed cost occurs when production reaches 1,100 units per month.

What is the total cost for a month when 1,000 units are produced?

Rs. ☐

(LO 2.3.1)

34 Vibrant Paints Co manufactures and sells paints. Business Unit A of the company makes a paint called Micra. Micra is made using three key materials: R, S and T.

At the end of period 1, a total material cost variance of Rs. 4,900,000 adverse was correctly recorded for Micra.

The following information relates to Micra for period 1:

Material	*Standard cost per litre* (Rs '000)	*Actual cost per litre* (Rs '000)	*Actual usage (litres)*
R	63	62	1,900
S	50	51	2,800
T	45	48	1,300

The standard ratio of mixing material R, material S and material T is 30:50:20.

The material price variance for Micra has been correctly calculated as Rs. 4,800,000 adverse.

What is the total material yield variance for Micra for period 1?

- ○ Rs. 700,000 favourable
- ○ Rs. 800,000 adverse
- ○ Rs. 800,000 favourable
- ○ Rs. 900,000 adverse

(LO 2.1.4)

35 A company operates in export and import markets, and its operational cash flows are affected by movements in exchange rates, which are highly volatile. As a result, the company has great difficulty in establishing a budgeting system that is reliable for more than three months ahead.

Which of the following approaches to budgeting would be most appropriate for this company's situation?

Select...
Flexible budget
Incremental budget
Rolling budget
Zero-based budget

(LO 2.3.2)

---

36 Tech World is a company which manufactures mobile phone handsets. From its past experiences, Tech World has realised that whenever a new design engineer is employed, there is a learning curve with a 75% learning rate which exists for the first 15 jobs.

A new design engineer has just completed their first job in five hours.

Note. At the learning rate of 75%, the learning factor (b) is equal to –0·415.

How long would it take the design engineer to complete the sixth job?

- ○ 2.377 hours
- ○ 1.442 hours
- ○ 2.564 hours
- ○ 5 hours

(LO 1.3.3)

---

37 The following cost information relates to product XY, which is produced in a continuous process from several different materials.

	Rs '000
Actual quantity of materials at standard price	19,960
Actual quantity of materials at actual price	23,120
Actual yield at standard materials cost	20,800
Standard yield from actual input of materials at standard cost	19,552

What is the favourable materials yield variance for the period?

Rs. [ ]

(LO 2.1.4)

---

38 The following statements have been made about standard mix and yield variances.

(1) Mix variances should be calculated whenever a standard product contains two or more direct materials.
(2) When a favourable mix variance is achieved, there may be a counterbalancing adverse yield variance.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.1.4)

---

39 A company sells two products X and Y. Product X sells for Rs. 30,000 per unit and achieves a standard contribution of Rs. 12,000 per unit, which is 40% of the selling price. Product Y, a new product, sells for Rs. 80,000 per unit and achieves a standard contribution of just Rs. 10,000 per unit, which is 12.5% of the selling price. Budgeted sales are 5,000 units of X and 3,000 units of Y.

However, the sudden cancellation of an advertising campaign for Product Y has meant that sales for the product will be well below budget, and there has been some price discounting in an attempt to obtain sales for the product. Sales of X were in line with the budget.

Which of the following sales variances, if calculated, would you expect to show a favourable variance for the period?

- ○ Sales mix variance
- ○ Sales price variance
- ○ Sales quantity variance
- ○ Sales volume variance

(LO 2.1.4)

---

40 A company makes and sells three products. Budgeted and actual results for the period just ended were as follows.

Product	*Budgeted sales*	*Budgeted profit per unit*	*Actual sales*	*Actual profit per unit*
	Units	Rs	Units	Rs
X	800	100	700	80
Y	1,000	60	1,200	60
Z	600	120	350	160
	2,400		2,250	

What was the adverse sales mix variance?

Rs. ☐

(LO 2.1.4)

---

41 Which of the following provides the most suitable definition of the controllability principle in business?

- ○ A fundamental principle of management is the responsibility to control the organisation
- ○ Managers should be held accountable only for costs and revenues over which they have some influence or control
- ○ Organisations should be divided into budget centres for the purpose of operational control
- ○ Performance measures should be reported to managers to enable them to control operations

(LO 2.3.4)

---

42 A standard product uses 3 kg of direct material costing Rs. 400 per kg. During the most recent month, 120 units of the product were manufactured. These required 410 kg of material costing Rs. 450 per kg. It is decided in retrospect that the standard usage quantity of the material should have been 3.5 kg, not 3 kg.

What is the favourable materials operational usage variance, if it is chosen to use planning and operational variances for reporting performance?

Rs. ☐

(LO 2.1.5)

---

43 The following statements have been made about learning curves.

(1) Learning curves are easier to apply in companies with a high labour turnover than those with a lower rate of staff turnover.

(2) Learning rates are not affected by time gaps between the production of additional units of a product.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 1.3.3)

---

44 In which **TWO** of the following ways might a budgetary control be a disincentive to management to achieve targeted performance?

- ☐ Control reports are provided too late
- ☐ Targets are too easy
- ☐ Targets are not communicated
- ☐ Budgets are prepared on a bottom-up basis

(LO 2.3.2)

---

45 For which of the following reasons is zero-based budgeting (ZBB) often considered more suitable for public sector service organisations than for private sector companies?

- ○ ZBB is more suited to costs where there is little discretionary spending, as in the public sector services.
- ○ The public sector is better able to afford the high cost of ZBB.
- ○ ZBB is used in a top-down approach to budgeting, which is more common in the public sector than the private sector.
- ○ It is easier to put public sector activities into decision packages because they are more easily definable than in the private sector.

(LO 2.3.2)

---

46 Which **TWO** of the following points state why it is generally regarded to be more difficult to set standards for service function costs than for manufacturing costs?

- ☐ There is often no measurable output from service functions
- ☐ The activities of many service functions are of a non-standard nature
- ☐ The costs of many service functions are predominantly variable
- ☐ Tasks in many service industries are usually quick and simple

(LO 1.1.1)

---

47 Which of the following correctly describes a standard hour?

- ○ An hour during which only standard units are made
- ○ An hour during which there are no bottlenecks or capacity issues
- ○ The quantity of work achievable at standard performance in an hour
- ○ An hour for which standard labour rates are paid

(LO 1.1.1)

---

48 The following statements have been made about a transfer pricing system where Division A transfers output to Division B.

(1) Internal transfers should be preferred when there is an external market for the transferred item, because there will be more control over quality and delivery.

(2) The transfer price will determine how profits will be shared between the two divisions.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.5.1)

---

49 In a company with a divisionalised structure, Division A transfers its output to Division B. Division A produces just one item, Component X. Division B makes and sells an end product that requires one unit of Component X.

	Rs'000 per unit of X
Marginal cost of production in Division A	8
Fixed overhead cost of production	3
Cost of selling in the external market	1
Market price in the external market	16
Division B contribution from further processing Component X, before deducting the transfer cost	25

Division A is working at full capacity.

What should be the minimum transfer price per unit of Component X in this situation?

Rs. ☐

(LO 2.5.1)

---

50 The following statements have been made about performance measurements in not-for-profit organisations.

(1) Not-for-profit organisations do not have financial objectives.

(2) The outputs produced by not-for-profit organisations are easier to measure than output of commercial companies.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.4.1)

---

51 Which of the following figures would usually be the most suitable for divisional profit for the purpose of performance measurement?

- ○ Gross profit
- ○ Profit before interest and tax
- ○ Profit before tax
- ○ Profit after tax

(LO 2.4.1)

---

52 Organisations may need to develop performance measures to ensure that the needs of stakeholders are met.

Which **TWO** of the following measures are geared towards customer needs?

- ☐ Morale index
- ☐ Percentage of repeat customers
- ☐ Number of warranty claims
- ☐ Profitability index

(LO 2.4.1)

---

53 A hospital wishes to establish a performance measurement for its 'quality of care', and in particular its adherence to appointment times for patients receiving medical checks.

Which of the following performance measurements would be the most suitable for this purpose?

- ○ Average length of appointments
- ○ Average number of appointments per day
- ○ Average number of days from making an appointment to the appointment date
- ○ Average waiting time at the hospital

(LO 2.4.1)

---

54 Which of the following measures of performance for public sector services is a measure of efficiency?

- ○ Number of patients treated per Rs. 1 million spent on the state hospital service
- ○ Percentage reduction in the spending budget of a government department compared with the previous year
- ○ Proportion of reported crimes that are solved by the police service
- ○ Proportion of students in a state-owned college achieving good pass grades in their examinations

(LO 2.4.1)

---

55 When goods are transferred from one division in a company to another division, and there is an intermediate external market for the transferred item in which the goods could be sold, which of the following states the economic transfer pricing rule for what the maximum transfer price should be?

- ○ Marginal cost of the transferring-out division minus any lost contribution of the transferring-out division from having to make the internal transfer
- ○ The higher of the net marginal revenue for the transferring-in division and the external purchase price in the market for the intermediate product
- ○ The lower of the net marginal revenue for the transferring-in division and the external purchase price in the market for the intermediate product
- ○ None of the above

(LO 2.5.1)

---

56 A company has a call centre to handle queries and complaints from customers. The company is concerned about the average length of calls and the time that it takes to deal with customers. As part of its balanced scorecard, it has set a target for reducing the average time per customer call.

A target for reducing the average time per call would relate to which of the four balanced scorecard perspectives?

Select...
Customer
Financial
Innovation and learning
Internal business

(LO 2.3.3)

---

57 In a balanced scorecard system of performance measurement, which of the following is most likely to be used as a measure of performance from the customer perspective?

- ○ Increase in size of product range
- ○ Percentage of customers making repeat orders
- ○ Number of orders won per sales representative
- ○ Speed of processing an order

(LO 2.3.3)

---

58 The following statements have been made about performance measurements in not-for-profit organisations.

(1) Providing value for money (VFM) means providing a service that is cheap, efficient and effective.

(2) For the refuse collection department of a local government authority, the efficiency of operations can be measured by the proportion of collected refuse that is recycled.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.4.1)

---

59 The following statements have been made about divisionalisation and performance measurement systems.

(1) Residual income as a measure of performance enables fair comparisons to be made between the performances of different divisions in the company.

(2) When a transfer price is based on cost because there is no external market for the transferred item, at least one of the divisional managers is likely to consider the transfer price as 'unfair'.

Which of the above statements is/are true?

- ○ Statement 1 only
- ○ Statement 2 only
- ○ Neither statement 1 nor statement 2
- ○ Both statement 1 and statement 2

(LO 2.5.2)

---

60 Which of the following aspects of performance is measured by the average time between receipt of an order from a customer and the time the goods are despatched?

- ○ Quality
- ○ Quantity
- ○ Reliability
- ○ Speed

The following information applies to Questions 61 and 62

A company produces three products D, E and F. The statement below shows the selling price and product costs per unit for each product, based on a traditional absorption costing system.

	Product D	*Product E*	*Product F*
	Rs'000s	Rs'000s	Rs'000s
Selling price per unit	32	28	22
Variable costs per unit			
Direct material	10	8	6
Direct labour	6	4	4
Variable overhead	4	2	2
Fixed cost per unit			
Fixed overhead	9	6	6
Total product cost	29	20	18
Profit per unit	3	8	4

	Product D Rs'000s	*Product E* Rs'000s	*Product F* Rs'000s
Additional information:			
Demand per period (units)	3,000	4,000	5,000
Time in Process A (minutes)	20	25	15

Each of the products is produced using Process A which has a maximum capacity of 2,500 hours per period.

---

61 If a traditional contribution approach is used, the ranking of products, in order of priority, for the profit maximising product mix will be:

- ○ D, E, F
- ○ E, D, F
- ○ F, D, E
- ○ D, F, E

(LO 1.1.4)

---

62 If a throughput accounting approach is used, the ranking of products, in order of priority, for the profit maximising product mix will be:

- ○ D, E, F
- ○ E, D, F
- ○ F, D, E
- ○ D, F, E

(LO 1.1.4, 2.2.1)

---

63 One important aim of a post-completion audit is to:

- ○ Obtain sign-off on all documentation by the project sponsor
- ○ Appraise the performance of the project manager
- ○ Capture organisational learning and document it to ensure lessons are learnt
- ○ Close the budget codes to prevent future expenditure

(LO 1.1.4, 2.2.1)

---

64 Quality management, in the context of project management, should focus on:

- ○ Ensuring the fitness for purpose of deliverables
- ○ Inspection and testing of deliverables
- ○ Ensuring professionally presented project reports
- ○ The post-completion audit

(LO 3.3.7)

---

65 Identify the main benefits of post-completion auditing from the list below.

Select **ALL** that apply.

- ☐ Improved decision making
- ☐ Better researched projects
- ☐ Improved internal controls
- ☐ Highlight reasons for successful projects
- ☐ The process is quick and inexpensive

(LO 3.3.7)

---

66 In which project report or document would you expect to find non-financials costs and benefits discussed as part of investment appraisal?

- ○ Post-completion audit report
- ○ Project status report
- ○ Completion report
- ○ Budget report
- ○ Project quality report

(LO 3.3.6)

---

67 Company Z has invested over Rs'000s 2 million in 20 projects over the past eight years. The directors of Z are unsure whether the company has always received value for money from their investment in capital projects. They are considering introducing a system of post-completion audits.

Which of the following are true with regard to a post-completion audit?

Select **ALL** that apply.

- ○ Post-completion audits could produce valuable insights.
- ○ Post-completion audits will not prevent dysfunctional behaviour by project sponsors.
- ○ Project sponsors should be held liable for all negative findings from post-completion audits.
- ○ It may be difficult to introduce post-completion audits.
- ○ Only those projects starting after the audit system was introduced should be audited.

(LO 3.3.7)

---

68 A company has a call centre to handle queries and complaints from customers. The company is concerned about the average length of calls and the time that it takes to deal with customers. As part of its balanced scorecard, it has set a target for reducing the average time per customer call.

A target for reducing the average time per call would relate to which one of the four balanced scorecard perspectives?

- ○ Customer perspective
- ○ Financial perspective
- ○ Innovation and learning perspective
- ○ Internal business (operational) perspective

(LO 2.3.3)

---

69 Which of the following are included within activity based management (ABM)?

(i) Cost reduction
(ii) Product design decisions
(iii) Variance analysis
(iv) Operational control
(v) Performance evaluation

- ○ (i) only
- ○ (i), (iii), (iv) and (v)
- ○ (iii), (iv) and (v) only
- ○ (i), (ii), (iv) and (v) only

(LO 1.2.6)

---

70 Which of the following statements about setting budget targets is/are correct?

(1) Setting 'ideal standards' as targets for achievement should motivate employees to perform to the best of their ability.

(2) Setting low standards as targets for achievement should motivate employees because they should usually achieve or exceed the target.

- ○ Statement 1 only is correct
- ○ Statement 2 only is correct
- ○ Neither statement 1 nor statement 2 is correct
- ○ Both statement 1 and statement 2 are correct

(LO 2.3.4)

SECTION 2: 10 MARK QUESTIONS

Questions 71 to 96 cover 10 mark questions from across the syllabus.

71 JYT

JYT manufactures and sells a range of products. It is not dominant in the market in which it operates and, as a result, it has to accept the market price for each of its products. The company is keen to ensure that it continues to compete and earn satisfactory profit at each stage throughout a product's life cycle.

Required

Explain how JYT could use target costing AND kaizen costing to improve its future performance.

Your answer should include an explanation of the differences between target costing and kaizen costing.

(LO 1.2.2) **(10 marks)**

72 HT Consumer Goods

HT manufactures and sells consumer goods. The market in which it operates is highly competitive and HT is constantly designing new products in order to maintain its market share. The life cycle of products in the market is extremely short with all of the manufacturers constantly introducing new products or variations on existing products.

Consumers consider two main factors when buying these products: price and quality. HT uses a penetration pricing policy when launching its products and is always striving to improve its quality from product design stage through to customer care. As a result it has a 15% market share, and its largest competitor has a 6% market share with around 30 other companies sharing the remainder of the market.

Required

(1) **Compare and contrast**

- Costs of quality conformance; and
- Costs of quality non-conformance. **(3 marks)**

(2) **Discuss** the relationship between quality conformance costs and product selling prices in HT. **(4 marks)**

(3) **Explain** how kaizen principles could be used by HT to extend the life of its products. **(3 marks)**

(LO 1.1.4) **(Total = 10 marks)**

73 Jola Publishing Co

Jola Publishing Co publishes two books.

The first is a children's book (CB), which is sold in large quantities to government schools. The book is produced in four large production runs has numerous government inspections and quality assurance checks. The paper used is strong, the book has only a few words and relies on pictures to convey meaning.

The second book is a technical journal (TJ). It is produced in monthly production runs, 12 times a year. The paper used is of relatively poor quality and is not subject to any governmental controls and consequently only a small number of inspections are carried out. The TJ uses far more machine hours than the CB in its production.

The directors are concerned about the performance of the two books and are wondering what the impact would be of a switch to an activity based costing (ABC) approach to accounting for overheads. They currently use absorption costing, based on machine hours for all overhead calculations. They have produced an analysis for the coming year as follows:

	CB		*TJ*
	Rs. per unit		Rs. per unit
Paper (400g @ Rs. 20 per kg)	8.00	(100g @ 10 per kg)	1.00
Printing ink (50 ml @ Rs. 300 per litre)	15.00	(150 ml @ Rs. 300 per litre)	45.00
Machine costs (6 mins @ Rs. 120 per hour)	12.00	(10 mins @ Rs. 120 per hour)	20.00
Overheads (6 mins @ Rs. 240 per hour)	24.00	(10 mins @ Rs. 240 per hour)	40.00
Total cost	59.00		106.00
Selling price	93.00		140.00
Margin	34.00		34.00

The main overheads involved are:

Overhead	% of total overhead	Activity driver
Property costs	75.0%	Machine hours
Quality control	23.0%	Number of inspections
Production set up costs	2.0%	Number of set ups

If the overheads for the previous accounting year were re-allocated under ABC principles then the results would be that the overhead allocation to CB would be Rs. 0.50 higher at Rs. 23.50 per unit, and the overhead allocated to TJ would be Rs. 3.00 lower at Rs. 36.50 per unit.

Required

(1) **Explain** why the overhead allocations have changed in the way indicated above. **(8 marks)**

(2) Briefly **explain** the implementation problems often experienced when ABC is first introduced. **(2 marks)**

(LO 1.2.1–6) **(Total = 10 marks)**

74 LMN

LMN comprises three trading divisions plus a Head Office. There is a director for each trading division and, in addition, there is a Managing Director who is based in Head Office. Divisional directors are empowered to make decisions concerning the day to day operations of their division and investment decisions requiring an initial investment up to Rs. 100,000. Investment decisions involving greater initial expenditure must be authorised by the Managing Director. Inter-divisional trading occurs between all of the trading divisions. The transfer prices are determined by Head Office. Head Office provides services and facilities to each of the trading divisions.

At the end of each month, the actual costs of Head Office are apportioned to the trading divisions. Each Head Office cost is apportioned to the trading divisions using an appropriate basis. The bases used are: number of employees; value of sales; capital invested; and standard hours of service delivered.

The Head Office costs, together with the costs and revenues generated at divisional level, are summarised in a divisional performance report each month. The divisional directors are not happy with the present performance report and how it is used to appraise their performance.

Required

(1) **Explain**, using examples from the scenario, three issues that LMN should consider when designing a new divisional performance report. **(6 marks)**

LMN is thinking of introducing Activity Based Costing at its Head Office to help with the apportionment of all its costs to the divisions.

(2) **Discuss** the advantages of applying Activity Based Costing to apportion all of the Head Office costs. **(4 marks)**

(LO 1.3.1, 2.3.1) **(Total = 10 marks)**

75 Wargrin

Wargrin designs, develops and sells many PC games. Games have a short lifecycle lasting around three years only. Performance of the games is measured by reference to the profits made in each of the expected three years of popularity. Wargrin accepts a net profit of 35% of turnover as reasonable. A rate of contribution (sales price less variable cost) of 75% is also considered acceptable.

Wargrin has a large centralised development department which carries out all the design work before it passes the completed game to the sales and distribution department to market and distribute the product.

Wargrin has developed a brand new game called Stealth and this has the following budgeted performance figures.

The selling price of Stealth will be a constant Rs. 30,000 per game. Analysis of the costs show that at a volume of 10,000 units a total cost of Rs. 130 million is expected. However at a volume of 14,000 units a total cost of Rs. 150 million is expected. If volumes exceed 15,000 units the fixed costs will increase by 50%.

Stealth's budgeted volumes are as follows:

	Year 1	*Year 2*	*Year 3*
Sales volume	8,000 units	16,000 units	4,000 units

In addition, marketing costs for Stealth will be Rs. 60 million in year one and Rs. 40 million in year two. Design and development costs are all incurred before the game is launched and has cost Rs. 300 million for Stealth. These costs are written off to the income statement as incurred (ie before year 1 above).

Required

(1) **Explain** the principles behind lifecycle costing and briefly state why Wargrin in particular should consider these lifecycle principles. **(3 marks)**

(2) **Produce** the budgeted results for the game 'Stealth' and briefly assess the game's expected performance, taking into account the whole lifecycle of the game. **(7 marks)**

(LO 1.2.1–6) **(Total = 10 marks)**

76 The Gadget Co

The Gadget Co has 3 customers: A, B and C. All require a slightly different product. Until now, it has used traditional absorption costing to allocate overheads to the customers. The company is now considering an activity based costing system in the hope that it will improve profitability. Information for the three customers for the last year is as follows:

	A	*B*	*C*
Production and sales volumes (units)	15,000	12,000	18,000
Selling price per unit	Rs. 7,500	Rs. 12,000	Rs. 13,000
Raw material cost per unit	Rs. 2,400	Rs. 3,600	Rs. 4,800
Direct labour cost per unit	Rs. 1,480	Rs. 2,220	Rs. 2,960
Machine hours per unit	0.5	0.7	0.9
Number of production runs per annum	16	12	8
Number of purchase orders per annum	24	28	42
Number of deliveries per annum	48	30	62

Using an overhead absorption rate of Rs. 28,300 per direct labour hour, the unit costs for each customer using traditional absorption costing were Rs. 6,710 for Customer A, Rs. 10,070 for Customer B and Rs. 13,420 for Customer C.

The company is considering an activity based costing system in the hope that it will improve profitability. The annual overhead costs for the last year were as follows:

	Rs. 000
Machine set up costs	26,550
Machine running costs	66,400
Procurement costs	48,000
Delivery costs	54,320

Required

(1) Calculate the full cost per unit for each customer in the last year using activity based costing. Do your calculations to two decimal places. **(6 marks)**

(2) Explain briefly how activity based costing may help The Gadget Co improve the profitability of each customer. **(4 marks)**

(LO 2.2.1–6) **(Total = 10 marks)**

77 New product

The budget for the production cost of a new product was based on the following assumptions:

(i) Time for the 1st batch of output = 10 hours

(ii) Learning rate = 80%

(iii) Learning will cease after 40 batches, and thereafter the time per batch will be the same as the time of the final batch during the learning period, ie the 40th batch

(iv) Standard direct labour rate per hour = Rs. 120

An extract from the out-turn performance report based on the above budget is as follows.

	Budget	*Actual*	*Variance*
Output (batches)	60	50	10 adverse
Direct labour hours	163.53	93.65	69.88 favourable
Direct labour cost	Rs. 19,620	Rs. 11,460	Rs. 8,160 favourable

Further analysis has shown that, due to similarities between this product and another that was developed last year, the rate of learning that should have been expected was 70% and that the learning should have ceased after 30 batches. Other budget assumptions for the new product remain valid.

Required

(1) **Prepare** a revised performance report for the new product that:

(i) Shows the flexed budgeted direct labour hours and direct labour cost based on the revised learning curve data; and

(ii) Shows the variances that reconcile the actual results to your flexed budget in as much detail as possible. **(7 marks)**

(2) **Explain** why your report is more useful to the production manager than the report shown above. **(3 marks)**

Note. The learning index values for an 80% and a 70% learning curve are –0.3219 and –0.5146 respectively.

(LO 1.2.5) **(Total = 10 marks)**

78 W Llc

W Llc designs and sells computer games. There are many other firms in this industry. For the last five years the senior management has required detailed budgets to be produced for each year with slightly less detailed plans for the following two years.

The managing director of W Limited has recently attended a seminar on budgeting and standard costing and heard the 'Beyond Budgeting' arguments that have been advanced by Hope and Fraser, among others.

Required

(1) Briefly **describe** the 'beyond budgeting' approach; and **(2 marks)**

(2) **Assess,** for the management of W Limited, whether or not it should change its current budgeting system to a 'beyond budgeting' approach. **(3 marks)**

(3) Briefly **discuss** three reasons why standard costing may not be appropriate in a modern business environment. **(5 marks)**

(LO 2.3.4, 2.1.7) **(Total = 10 marks)**

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79 DVD and Bluray

A company produces and sells DVD players and Blu-ray players.

Extracts from **the budget** for April are shown in the following table:

	Sales (players)	*Selling price (per player)*	*Standard cost (per player)*
DVD	3,000	Rs. 75,000	Rs. 50 ,000
Blu-ray	1,000	Rs. 200 ,000	Rs. 105,000

The Managing Director has sent you a copy of an email she received from the Sales Manager. The content of the email was as follows:

> *We have had an excellent month. There was an adverse sales price variance on the DVDs of Rs. 18 million but I compensated for that by raising the price of Blu-ray players. Unit sales of DVD players were as expected but sales of the Blu-rays were exceptional and gave a total sales volume profit variance of Rs. 19 million. I think I deserve a bonus!*

The Managing Director has asked for your opinion on these figures. You obtained the following information:

Actual results for April were:

	Sales (players)	*Selling price (per player)*
DVD	3,000	Rs. 69,000
Blu-ray	1,200	Rs. 215 ,000

The total market demand for DVD players was as budgeted but as a result of distributors reducing the price of Blu-ray discs the total market for Blu-ray players grew by 50% in April. The company had sufficient capacity to meet the revised market demand for 1,500 units of its Blu-ray players and therefore maintained its market share.

Required

(1) **Calculate** the following operational variances based on the revised market details:

(i) The total sales mix profit margin variance **(2 marks)**

(ii) The total sales volume profit variance **(2 marks)**

(2) **Explain,** using the above scenario, the importance of calculating planning and operational variances for responsibility centres. **(6 marks)**

(LO 2.1.1, 2.1.4, 2.1.5, 2.1.6) **(Total = 10 marks)**

80 Budgets for solicitors

A firm of solicitors is preparing its budgets for 20X0. The structure of the firm is that it has a managing partner who is responsible for client and staff management, the firm's accounts and compliance matters and three other partners who each take responsibility for case matters depending on the branch of law that is involved in each case.

For a number of years the managing partner has prepared the budgets for the firm. These include budgets for fee income and costs analysed by each partner, and a cash budget for the firm as a whole. The firm has overdraft facilities which are renewable in June each year and sets cash balance targets for each month that reflect the seasonality of some of its work.

At the end of each month there is a partners' meeting at which the managing partner presents a statement that compares the actual results of the month and the year to date with the corresponding budget. At this meeting all partners are asked to explain the reasons for the variances that have arisen.

The managing partner recently attended a course on 'Budget Planning & Cost Control' at which the presenter argued that each of the partners in the firm should be involved in the budget setting process. However, the managing partner is not convinced by this argument as she believes that this could lead to budget manipulation.

Required

(1) **Explain** feedback and feed-forward control systems and give an example of each in the context of the firm of solicitors. **(5 marks)**

(2) **Discuss** ONE potentially beneficial consequence and ONE potentially adverse consequence of involving the firm's other partners in the budget setting process of the firm. **(5 marks)**

(LO 2.3.1, 2.3.2, 2.3.4) **(Total = 10 marks)**

81 PQ

PQ manufactures and sells consumer electronics. It is constantly working to design the latest gadgets and 'must-haves' which are unique in the market place at the time they are launched. The management of PQ are aware of the short product life cycles in this competitive market and consequently use a market skimming pricing strategy at the introduction stage.

Required

Explain the changes that are likely to occur in the following items at the three later stages in the product life cycle of a typical PQ product.

(1) Selling price
(2) Production costs
(3) Selling and marketing costs

(LO 1.2.3, 1.3.1, 3.4.5) **(10 marks)**

82 X Group

The X Group is a well-established manufacturing group that operates a number of companies using similar production and inventory holding policies. All of the companies are in the same country though there are considerable distances between them.

The group has traditionally operated a constant production system whereby the same volume of output is produced each week, even though the demand for the group's products is subject to seasonal fluctuations. As a result there is always finished goods inventory in the group's warehouses waiting for customer orders. This inventory will include a safety inventory equal to two weeks' production.

Raw material inventories are ordered from suppliers using the Economic Order Quantity (EOQ) model in conjunction with a computerised inventory control system which identifies the need to place an order when the reorder level is reached. The purchasing department is centralised for the group. On receiving a notification from the computerised inventory control system that an order is to be placed, a series of quotation enquiries are issued to prospective suppliers so that

the best price and delivery terms are obtained for each order. This practice has resulted in there being a large number of suppliers to the X Group. Each supplier delivers directly to the company that requires the material.

The managing director of the X Group has recently returned from a conference on World Class Manufacturing and was particularly interested in the possible use of just-in-time (JIT) within the X Group.

Required

Explain how the adoption of JIT might affect profitability within the X Group.

(L O 1.1.2, 5.3.1, 5.4.2) **(10 marks)**

83 HJ

HJ is a printing company that specialises in producing high quality cards and calendars for sale as promotional gifts. Much of the work produced by HJ uses similar techniques and for a number of years HJ has successfully used a standard costing system to control its costs.

HJ is now planning to diversify into other promotional gifts such as plastic moulded items including key fobs, card holders and similar items. There is already a well-established market place for these items but HJ is confident that with its existing business contacts it can be successful if it controls its costs. Initially HJ will need to invest in machinery to mould the plastic, and it is likely that this machinery will have a life of five years. An initial appraisal of the proposed diversification based on low initial sales volumes and marginal cost based product pricing for year 1, followed by increases in both volumes and selling prices in subsequent years, shows that the investment has a payback period of four years.

Required

(1) **Explain** the relationship between target costs and standard costs and how HJ can derive target costs from target prices. **(5 marks)**

(2) **Discuss** the conflict that will be faced by HJ when making pricing decisions based on marginal cost in the short term and the need for full recovery of all costs in the long term. **(5 marks)**

(LO 1.2.2, 1.3.1, 3.4.1) **(Total = 10 marks)**

84 Cement Co

Cement Co is a company specialising in the manufacture of cement, a product used in the building industry. The company has found that when weather conditions are good, the demand for cement increases since more building work is able to take place. Last year, the weather was so good, and the demand for cement was so great, that Cement Co was unable to meet demand. Cement Co is now trying to work out the level of cement production for the coming year in order to maximise profits. The company doesn't want to miss out on the opportunity to earn large profits by running out of cement again. However, it doesn't want to be left with large quantities of the product unsold at the end of the year, since it deteriorates quickly and then has to be disposed of. The company has received the following estimates about the probable weather conditions and corresponding demand levels for the coming year:

Weather	*Probability*	*Demand*
Good	25%	350,000 bags
Average	45%	280,000 bags
Poor	30%	200,000 bags

Each bag of cement sells for Rs. 9,000 and costs Rs. 4,000 to make. If cement is unsold at the end of the year, it has to be disposed of at a cost of Rs. 500 per bag.

Cement Co has decided to produce at one of the three levels of production to match forecast demand. It now has to decide which level of cement production to select.

Required

(1) **Prepare** a pay off table to show all the possible profit outcomes. **(6 marks)**

(2) **Calculate** the level of cement production the company should choose, based on the following decision rules:

(i) Maximin **(1 mark)**
(ii) Maximax **(1 mark)**
(iii) Expected value **(2 marks)**

You must justify your decision under each rule, showing all necessary calculations.

(LO 4.2.1) **(Total = 10 marks)**

85 HT

The material used by HT plc is also used in a wide variety of other applications and is in relatively limited supply. As business conditions improve in general, there will be pressure for the price of this material to rise, but strong competition in HT plc's sector of the market would make it unlikely that increased material costs can be passed on to customers in higher product prices. The position on material supplies is that HT plc can obtain 20,000 kgs at current prices.

In addition, reductions in the skilled labour force made during a recession mean that the number of available direct labour hours is estimated at no more than 257,600 hours for the next year.

Demand for each product over the year is forecast to be as follows.

	Units
HT01	16,000
HT02	10,000
HT03	6,000

Required

Prepare a linear programme from the above data in order to obtain the annual production/sales plan which will maximise HT plc's contribution earnings and profit. (You are not required to solve the problem.)

(LO 3.1.2) **(10 marks)**

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86 HT 123

The following is the final tableau, obtained as a result of running a linear programme.

Final tableau

HT01	*HT02*	*HT03*	S_1	S_2	S_3	S_4	S_5	*Bij*
0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	6,000.0
1.0	1.2	1.3	0.0	0.0	0.0	0.0	0.0	10,304.0
0.0	–1.2	–1.3	–0.0	0.0	1.0	0.0	0.0	5,696.0
0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	10,000.0
0.0	0.8	1.7	–0.0	1.0	0.0	0.0	0.0	9,696.0
0.0	2.0	1.5	0.7	0.0	0.0	0.0	0.0	180,320.0

All figures given above are in in thousand rupees.

Where S_1, S_2, S_3, S_4, S_5 are the slack variables for labour, materials, HT01, HT02 and HT03 respectively. Fixed costs are Rs. 184,000,000.

Required

Prepare as complete an interpretation of the final tableau as you can and give an estimate of the final net profit figure.

(LO 3.2.1) **(10 marks)**

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87 PP

PP is a large architectural partnership based in Sri Lanka. Its client base ranges from large corporations to an extensive range of smaller companies and individuals.

Much of PP's marketing and client liaison efforts to date have focussed on the larger corporations because there tends to be repeat business from such clients. However, a recent client survey has revealed that 75% of new business results from referrals from satisfied smaller clients. PP is therefore keen to improve its marketing efforts within the smaller client market. Improvements in the information technology (IT) systems currently used by PP are considered to be essential to such a development, to enable increased visibility of the company and its achievements across the whole client base and help promote new business.

PP's current annual revenue is Rs. 10,000 million.

Proposed IT project for a new Customer Relationship Management (CRM) system

PP is considering introducing a new Customer Relationship Management (CRM) system to help maintain more regular and better targeted communication with both current and potential new clients. The project is to be appraised over a four year time horizon.

An initial investment of Rs. 600,000,000 is required on 1 July 20X2, with no residual value at the end of the four year period. It is estimated that there would be on-going system maintenance costs of Rs. 50,000,000 a year but no other annual incremental costs attributable to the project. In terms of savings, it is planned that staff numbers would be reduced by one person at an annual saving of salary costs of Rs. 80,000,000 and also a saving of other costs of Rs. 20,000,000 per annum. However, redundancy pay and costs involved with redundancy arrangements would be approximately Rs. 200,000,000, payable on 1 July 20X2. Unless stated otherwise, all costs and revenue should be assumed to be paid or received at the end of the year in which they arise.

The partners of the practice are unsure how much new business would be generated by the new CRM system. The number of different unknown variables involved has made it very difficult to arrive at a firm answer. However, it is anticipated that any new business generated as a result of the CRM system would give rise to an increase in net cash inflows in each year that is equivalent to 52% of the annual cash inflow generated by new business. Assume that the additional net cash inflow generated by new business is the same in each of years 1 to 4.

PP evaluates IT projects using a conventional discounted cash flow approach based on costs and benefits that can be quantified with a degree of confidence. The partnership's cost of capital of 12% is to be used as the discount rate.

For the purposes of this question, taxation should be ignored.

Required

(1) Calculate the net present value (NPV) of the proposed IT project as at 1 July 20X2, ignoring the additional cash flows that might arise from new business. **(5 marks)**

(2) **Calculate** the additional annual cash inflow from new business that is required in order to achieve a zero net present value result. Use your answer from part (1) as the starting point for your calculation. **(5 marks)**

(LO 2.2.4) **(Total = 10 marks)**

88 T LLC

The Telephone LLC (T LLC) is a company specialising in the provision of telephone systems for commercial clients. There are two parts to the business:

- Installing telephone systems in businesses, either first time installations or replacement installations.
- Supporting the telephone systems with annually renewable maintenance contracts.

T LLC has been approached by a potential customer, Push LLC, who wants to install a telephone system in new offices it is opening. Whilst the job is not a particularly large one, T LLC is hopeful of future business in the form of replacement systems and support contracts for Push LLC. T LLC is therefore keen to accept the job provided it does not lose any money in the process. Push LLC has offered Rs. 1,300,000 for the contract. The following information should be considered:

(1) One of the company's salesmen has already been to visit Push LLC, to give them a demonstration of the new system, together with a complimentary lunch, the costs of which totalled Rs. 40,000.

(2) The installation is expected to take one week to complete and would require three engineers, each of whom is paid a monthly salary of Rs. 400,000. The engineers have just had their annually renewable contract renewed with T LLC. One of the three engineers has spare capacity to complete the work, but the other two would have to be moved from contract X in order to complete this one. Contract X generates a contribution of Rs. 500 per engineer hour. There are no other engineers available to continue with Contract X if these two engineers are taken off the job. It would mean that T LLC would miss its contractual completion deadline on Contract X by one week. As a result, T LLC would have to pay a one-off penalty of Rs. 50,000. Since there is no other work scheduled for their engineers in one week's time, it will not be a problem for them to complete Contract X at this point.

(3) T LLC's technical advisor would also need to dedicate eight hours of his time to the job. He is working at full capacity, so he would have to work overtime in order to do this. He is paid an hourly rate of Rs. 4,000 and is paid for all overtime at a premium of 50% above his usual hourly rate.

(4) Two visits would need to be made by the site inspector to approve the completed work. He is an independent contractor who is not employed by T Co, and charges Push Co directly for the work. His cost is Rs. 20,000 for each visit made.

(5) T LLC's system trainer would need to spend one day at Push Co delivering training. He is paid a monthly salary of Rs. 150,000 but also receives commission of Rs. 12,500 for each day spent delivering training at a client's site.

(6) 120 telephone handsets would need to be supplied to Push LLC. The current cost of these is Rs. 1,820 each, although T LLC already has 80 handsets in inventory. These were bought at a price of Rs. 1,680 each. The handsets are the most popular model on the market and frequently requested by T LLC's customers.

(7) Push LLC would also need a computerised control system called 'Swipe 2'. The current market price of Swipe 2 is Rs. 1,080,000, although T LLC has an older version of the system, 'Swipe 1', in inventory, which could be modified at a cost of Rs. 460,000. T LLC paid Rs. 540,000 for Swipe 1 when it ordered it in error two months ago and has no other use for it. The current market price of Swipe 1 is Rs. 545,000, although if Push LLC tried to sell the one they have, it would be deemed to be 'used' and therefore only worth Rs. 300,000.

(8) 1,000 metres of cable would be required to wire up the system. The cable is used frequently by T LLC and it has 200 metres in inventory, which cost Rs. 120 per metre. The current market price for the cable is Rs. 130 per metre.

(9) You should assume that there are four weeks in each month and that the standard working week is 40 hours long.

Required

Decide, using relevant costing principles, whether the offer of Rs. 1,300,000 should be accepted. Make detailed notes showing how each cost has been arrived at and explain why each of the costs above has been included or excluded from your decision.

(LO 3.2.1) **(10 marks)**

89 C Plc

C plc is a large company that manufactures and sells wooden garden furniture. It has three divisions:

The Wood Division (WD) purchases logs and produces finished timber as planks or beams. Approximately two-thirds of its output is sold to the Products Division, with the remainder sold on the open market.

The Products Division (PD) manufactures wooden garden furniture. The policy of C plc is that the PD must buy all its timber from the WD and sell all its output to the Trading Division.

The Trading Division (TD) sells wooden garden furniture to garden centres, large supermarkets, and similar outlets. It only sells items purchased from PD.

The current position is that all three divisions are profit centres and C plc uses return on investment (ROI) measures as the primary means to assess divisional performance. Each division adopts a cost-plus pricing policy for external sales and for internal transfers between divisions. The senior management of C plc has stated that the divisions should consider themselves to be independent businesses as far as possible.

Required

(1) **Explain**, for each division with reasons, the behavioural consequences that might arise as a result of the current policy for the structure and performance evaluation of the divisions. **(5 marks)**

The senior management of C plc has requested a review of the cost-plus transfer pricing policy that is currently used.

(2) **Explain** with reasons, an appropriate transfer pricing policy that could be used for transfers from PD to TD, indicating any problems that may arise as a consequence of the policy you suggest. **(5 marks)**

(LO 2.4.2, 2.5.1, 2.5.2) **(Total = 10 marks)**

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90 Transfer pricing

Transfer pricing can be a contentious issue.

Required

(1) **Discuss** the problems that arise specifically when determining transfer prices where divisions are located in different countries. **(5 marks)**

(2) **Explain** one context in which a transfer price based on marginal cost would be appropriate and briefly describe any issues that may arise from such a transfer pricing policy. **(5 marks)**

(LO 2.5.1, 2.5.2) **(Total = 10 marks)**

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91 RI and EVA

Residual Income and Economic Value Added (EVA®) are two tools of performance measurement.

Required

(1) **Explain** and **discuss** the similarities and differences between Residual Income and Economic Value Added (EVA®) as methods for assessing the performance of divisions. **(5 marks)**

(2) (i) Briefly **explain** the main features of Economic Value Added (EVA®) as it would be used to assess the performance of divisions. **(2 marks)**

(ii) Briefly **explain** how the use of EVA® to assess divisional performance might affect the behaviour of divisional senior executives. **(3 marks)**

(LO 2.4.1, 2.4.2) **(Total = 10 marks)**

92 Pasta division

A well-established food manufacturing and distribution company, specialising in Italian food products, currently has an annual turnover in excess of Rs. 15,000 million. At present, the company has three production and distribution divisions, each responsible for specific product groups.

The summary information of the pasta division relating to divisional assets and profitability is as follows.

Pasta division

This division produces a wide range of both dried and fresh pasta products which it sells to both the supermarket sector and the restaurant trade.

Last year the divisional figures were as follows.

	Rs. m
Investment in non-current assets	1,500
Investment in working capital	1,000
Operating profit	500

The company is currently considering expansion into a new but allied product range. This range consists of sauces and canned foods. Projected figures for the expansion into sauces and canned foods are as follows.

	Rs. m
Additional non-current assets required	750
Additional investment in working capital	350
Budgeted additional profit	198

The company has a cost of capital of 15%.

Required

(1) **Calculate** the return on investment for the division both before and after the proposed divisional expansion. **(5 marks)**

(2) **Calculate** the residual income for the division both before and after the proposed divisional expansion. **(5 marks)**

(LO 2.4.1, 2.4.2) **(Total = 10 marks)**

93 PKA

PKA LLC is a Sri Lankan company that sells goods solely within Sri Lanka. The recently-appointed financial manager of PKA LLC has been investigating the working capital management of the company and has gathered the following information:

Inventory management

The current policy is to order 100,000 units when the inventory level falls to 35,000 units. Forecast demand to meet production requirements during the next year is 625,000 units. The cost of placing and processing an order is Rs. 250,000, while the cost of holding a unit in stores is Rs. 500 per unit per year. Both costs are expected to be constant during the next year. Orders are received two weeks after being placed with the supplier. You should assume a 50-week year and that demand is constant throughout the year.

Accounts receivable management

Domestic customers are allowed 30 days' credit, but the financial statements of PKA LLC show that the average accounts receivable period in the last financial year was 75 days. The financial manager also noted that bad debts as a percentage of sales, which are all on credit, increased in the last financial year from 5% to 8%.

Required

(1) **Identify** the objectives of working capital management and discuss the conflict that may arise between them. **(3 marks)**

(2) **Calculate** the cost of the current ordering policy and determine the saving that could be made by using the economic order quantity model. **(7 marks)**

(LO 3.3.1, 3.3.2, 3.3.6) **(Total = 10 marks)**

94 FLG

FLG Co wishes to minimise its inventory costs. Annual demand for a raw material costing Rs. 12,000 per unit is 60,000 units per year. Inventory management costs for this raw material are as follows:

Ordering cost: Rs. 6,000 per order
Holding cost: Rs. 500 per unit per year

The supplier of this raw material has offered a bulk purchase discount of 1% for orders of 10,000 units or more. If bulk purchase orders are made regularly, it is expected that annual holding cost for this raw material will increase to Rs. 2,000 per unit per year.

Required

(1) **Calculate** the total cost of inventory for the raw material when using the economic order quantity. **(5 marks)**

(2) **Assess** whether accepting the discount offered by the supplier will minimise the total cost of inventory for the raw material. **(5 marks)**

(LO 5.3.1, 5.3.2) **(Total = 10 marks)**

95 Government bonds

A company is considering investing in government bonds.

Required

(1) **Calculate** the yield to maturity of a bond with a current price of a Rs. 100,000 bond with ten years to maturity is Rs. 88,000. The bonds have a coupon rate of 6% and repay face value of Rs. 100,000 at the end of the 10 years. **(5 marks)**

(2) **Calculate** the yield to maturity of a Rs. 1,000 bond which has a coupon rate of 12% and will repay its face value on redemption in four years' time. The bond is purchased for Rs. 1,090 ex interest. **(5 marks)**

(LO 5.4.2, 5.4.3) **(Total = 10 marks)**

96 Working capital

Required

Identify and explain the key areas of accounts receivable management.

(LO 5.2.1) **(Total = 10 marks)**

SECTION 3: 20 Mark questions

Questions 97 to 120 cover 20 mark questions from across the syllabus.

97 Brick by Brick

Brick by Brick (BBB) is a building business that provides a range of building services to the public. Recently they have been asked to quote for garage conversions (GC) and extensions to properties (EX) and have found that they are winning fewer GC contracts than expected.

BBB has a policy to price all jobs at budgeted total cost plus 50%. Overheads are currently absorbed on a labour hour basis. BBB thinks that a switch to activity based costing (ABC) to absorb overheads would reduce the cost associated to GC and hence make them more competitive.

You are provided with the following data:

Overhead category	*Annual overheads* Rs.	*Activity driver*	*Total number of activities per year*
Supervisors	90,000,000	Site visits	500
Planners	70,000,000	Planning documents	250
Property related	240,000,000	Labour hours	40,000
Total	400,000,000		

A typical GC costs Rs. 3,500,000 in materials and takes 30 labour hours to complete. A GC requires only one site visit by a supervisor and needs only one planning document to be raised. The typical EX costs Rs. 8,000,000 in materials and takes 50 hours to complete. An EX requires six site visits and five planning documents. In all cases labour is paid Rs. 150,000 per hour.

Required

(1) **Calculate** the cost and the quoted price of a GC and of an EX using ABC to absorb the overheads. **(6 marks)**

(2) Assuming that the cost of a GC falls by nearly 7% and the price of an EX rises by about 2% as a result of the change to ABC, **recommend** possible pricing strategies for the two products that BBB sells and suggest two reasons other than high prices for the current poor sales of the GC. **(8 marks)**

(3) One BBB manager has suggested that only marginal cost should be included in budget cost calculations as this would avoid the need for arbitrary overhead allocations to products. Briefly **discuss** this point of view and comment on the implication for the amount of mark-up that would be applied to budget costs when producing quotes for jobs. **(6 marks)**

(LO 2.1.7, 2.1.8, 3.4.1) **(Total = 20 marks)**

98 MN Llc

MN Llc manufactures automated industrial trolleys, known as TRLs. Each TRL sells for Rs. 2,000 and the material cost per unit is Rs. 600. Labour and variable overhead are Rs. 5,500 and Rs. 8,000 per week respectively. Fixed production costs are Rs. 450,000 per annum and marketing and administrative costs are Rs. 265,000 per annum.

The trolleys are made on three different machines. Machine X makes the four frame panels required for each TRL. Its maximum output is 180 frame panels per week. Machine X is old and unreliable and it breaks down from time to time – it is estimated that, on average, between 15 and 20 hours of production are lost per month. Machine Y can manufacture parts for 52 TRLs per week and machine Z, which is old but reasonably reliable, can process and assemble 30 TRLs per week.

The company has recently introduced a just-in-time (JIT) system and it is company policy to hold little work-in-progress and no finished goods stock from week to week. The company operates a 40-hour week, 48 weeks a year (12 months × 4 weeks) but cannot meet demand. The demand for the next year is predicted to be as follows and this is expected to be typical of the demand for the next four years.

	Units per week		*Units per week*
January	30	July	48
February	30	August	45
March	33	September	42
April	36	October	40
May	39	November	33
June	44	December	30

The production manager has suggested that the company replaces machine Z with machine G which can process 45 TRLs per week. The maintenance manager is keen to spend Rs. 100,000 on a major overhaul of machine X as he says this will make it 100% reliable.

Required

(1) **Calculate** the throughput accounting ratio (defined below) for the key resource for an average hour next year.

$$\text{Throughput accounting ratio} = \frac{\text{return per factory hour}}{\text{cost per factory hour}}$$

$$\text{where return per factory hour} = \frac{\text{sales price} - \text{material cost}}{\text{time on key resource}}$$

(5 marks)

(2) Briefly **describe** the uses to which advocates of throughput accounting suggest that the ratio be put. **(4 marks)**

(3) **Recommend** two other ratios which may be used by a company operating throughput accounting and explain the use to which they may be put. **(5 marks)**

(4) **Explain** how the concept of contribution in throughput accounting differs from that in marginal costing. **(6 marks)**

(LO 1.2.1) **(Total = 20 marks)**

99 A Co

A Co makes two products, B1 and B2. Its machines can only work on one product at a time. The two products are worked on in two departments by differing grades of labour. The labour requirements for the two products are as follows:

	Minutes per unit of product	
	B1	*B2*
Department 1	12	16
Department 2	20	15

There is currently a shortage of labour and the maximum times available each day in Departments 1 and 2 are 480 minutes and 840 minutes, respectively. The current selling prices and costs for the two products are shown below:

	B1	*B2*
	Rs' per unit	Rs per unit
Selling price	500.00	650.00
Direct materials	100.00	150.00
Direct labour	104.00	62.00
Variable overheads	64.00	92.00
Fixed overheads	128.00	184.00
Profit per unit	104.00	162.00

As part of the budget-setting process, A Co needs to know the optimum output levels. All output is sold.

Required

(1) **Calculate** the maximum number of each product that could be produced each day, and identify the limiting factor/bottleneck. **(5 marks)**

(2) Using a throughput approach, **calculate** the 'throughput-maximising' output each day, and the 'throughput contribution' at this level of output. **(5 marks)**

The company is currently developing a system of environmental costing.

(3) **Describe** the key features of an environmental management system. **(5 marks)**

(4) **Describe** four categories of environmental costs. **(4 marks)**

(LO 1.1.4, 1.4.1–3) **(Total = 20 marks)**

100 WC

WC is a company that installs luxury kitchens and bathrooms for customers who are renovating their houses. The installations are either pre-designed 'off the shelf' packages or highly customised designs for specific jobs.

The company operates with three divisions: Kitchens, Bathrooms and Central Services. The Kitchens and Bathrooms divisions are profit centres but the Central Services division is a cost centre. The costs of the Central Services division, which are thought to be predominantly fixed, include those incurred by the design, administration and finance departments. The Central Services costs are charged to the other divisions based on the budgeted Central Services costs and the budgeted number of jobs to be undertaken by the other two divisions.

The budgeting and reporting system of WC is not very sophisticated and does not provide much detail for the Directors of the company.

Budget details

The budgeted details for last year were:

	Kitchens	*Bathrooms*
Number of jobs	4,000	2,000
	Rs.'000	Rs.'000
Average price per job	10,000	7,000
Average direct costs per job	5,500	3,000
Central Services recharge per job	2,500	2,500
Average profit per job	2,000	1,500

Actual details

The actual results were as follows:

	Kitchens	*Bathrooms*
Number of jobs	2,600	2,500
	Rs.'000	Rs.'000
Average price per job	13,000	6,100
Average direct costs per job	8,000	2,700
Central Services recharge per job	2,500	2,500
Average profit per job	2,500	900

The actual costs for the Central Services division were Rs. 17,500 million.

Required

(1) **Calculate** the sales price variances and the sales mix profit and sales quantity profit variances. **(6 marks)**

(2) **Prepare** a statement that reconciles the budgeted and actual profits and shows appropriate variances in as much detail as possible. **(10 marks)**

(3) Using the statement that you prepared in part (2) above, **discuss**

~~(i)~~ The performance of the company for the year; **(4 marks)**

(LO 2.1.1–2.1.7) **(Total = 20 marks)**

101 FA/FB Fertiliser

A company manufactures two types of fertiliser (FA and FB). The company uses a standard costing system for planning and control purposes. Standards are set annually but budgets and variance reports are prepared each period.

Chemicals

Three chemicals (C1, C2 and C3) are used to make the fertilisers. C2 and C3 can be input directly to the manufacturing process but C1 has to be treated before it can be used. The treatment results in a loss of 30% of the chemicals treated. There are no further losses in the manufacturing process.

Details of the standards for the chemicals are as follows:

	C1	*C2*	*C3*
Price per kg	Rs. 8,000	Rs. 15,000	Rs. 12,000
Treatment loss	30%		
Content of finished product:			
per unit of FA	0.20 kg	0.15 kg	NIL
per unit of FB	0.20 kg	NIL	0.25 kg

Inventory policies

Chemicals: end of period holdings must be equal to 50% of the following period's requirements.

Treated C1 is used immediately. There are never any inventories of treated C1 at the start or end of any period.

Fertilisers: no finished products are to be held.

Period 1: output and sales

	Budget Units	*Actual Units*
FA	40,000	38,000
FB	24,000	25,000

Periods 2 and 3: sales budgets

	Period 2 Units	*Period 3 Units*
FA	40,000	44,000
FB	24,000	33,000

Required

(1) In Period 1, the company purchased and used 6,450 kg of C3. The cost of this purchase was Rs. 94,000,000. It has now been realised that the standard price of C3 should have been Rs. 14,500 per kg for Period 1.

(i) **Calculate** the planning variance, and the operational price and usage variances for C3 for Period 1. **(7 marks)**

(ii) **Explain** two problems associated with the reporting of planning variances. **(4 marks)**

(2) 'Variance analysis presents results after the actual events have taken place and therefore it is of little use to management for planning and control purposes, particularly in a modern manufacturing environment'.

Discuss the above statement. **(9 marks)**

(LO 2.1.1, 2.1.2, 2.1.4, 2.1.5) **(Total = 20 marks)**

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102 M LLC

M LLC designs, manufactures and assembles furniture. The furniture is for home use and therefore varies considerably in size, complexity and value. One of the departments in the company is the assembly department. This department is labour intensive; the workers travel to various locations to assemble and fit the furniture using the packs of finished timbers that have been sent to them.

Budgets are set centrally and they are then given to the managers of the various departments who then have the responsibility of achieving their respective targets. Actual costs are compared against the budgets and the managers are then asked to comment on the budgetary control statement. The statement for April for the assembly Department is shown below.

	Budget	*Actual*	*Variance*
Assembly labour hours	6,400	7,140	
	Rs.	Rs.	Rs.
Assembly labour	51,970	58,227	6,257 (A)
Furniture packs	224,000	205,000	19,000 (F)
Other materials	23,040	24,100	1,060 (A)
Overheads	62,060	112,340	50,280 (A)
Total	361,070	399,667	38,597 (A)

Note. The costs shown are for assembling and fitting the furniture (they do not include time spent travelling to jobs and the related costs). The hours worked by the manager are not included in the figure given for the assembly labour hours.

The manager of the assembly department is new to the job and has very little previous experience of working with budgets but he does have many years' experience as a supervisor in assembly departments. Based on that experience he was sure that the department had performed well. He has asked for your help in

replying to a memo he has just received asking him to 'explain the serious overspending in his department'. He has sent you some additional information about the budget:

(1) The budgeted and actual assembly labour costs include the fixed salary of Rs. 2,050 for the manager of the assembly department. All of the other labour is paid for the hours they work.

(2) The cost of furniture packs and other materials is assumed by the central finance office of M LLC to vary in proportion to the number of assembly labour hours worked.

(3) The budgeted overhead costs are made up of three elements: a fixed cost of Rs. 9,000 for services from central headquarters, a stepped fixed cost which changes when the assembly hours exceed 7,000 hours, and some variable overheads. The variable overheads are assumed to vary in proportion to the number of assembly labour hours. Working papers for the budget showed the impact on the overhead costs of differing amounts of assembly labour hours:

Assembly labour hours	5,000	7,500	10,000
Overhead costs	Rs. 54,500	Rs. 76,500	Rs. 90,000

The actual fixed costs for April were as budgeted.

Required

(1) **Prepare**, using the additional information that the manager of the assembly department has given you, a budgetary control statement that would be more helpful to him. **(9 marks)**

(2) **Discuss** the differences between the format of the statement that you have produced and that supplied by M plc. **(3 marks)**

(3) **Discuss** whether M plc should change to a system of participative budgeting. **(8 marks)**

(LO 2.3.2, 2.3.4, 2.3.5) **(Total = 20 marks)**

103 ZBB

Some commentators argue that: 'With continuing pressure to control costs and maintain efficiency, the time has come for all public sector organisations to embrace zero-based budgeting. There is no longer a place for incremental budgeting in any organisation, particularly public sector ones, where zero-based budgeting is far more suitable anyway.'

Required

(1) **Discuss** the particular difficulties encountered when budgeting in public sector organisations compared with budgeting in private sector organisations, drawing comparisons between the two types of organisations. **(6 marks)**

(2) **Explain** the terms 'incremental budgeting' and 'zero-based budgeting'. **(4 marks)**

(3) State the main stages involved in preparing zero-based budgets. **(6 marks)**

(4) **Discuss** the limitations and advantages of ZBB within a public sector organisation. **(4 marks)**

(LO 2.3.1, 2.3.2, 2.3.3) **(Total = 20 marks)**

104 GHK

GHK manufactures four products from different combinations of the same direct materials and direct labour. An extract from the flexible budgets for next quarter for each of these products is as follows.

Product	*G*		*H*		*J*		*K*	
Units	3,000	5,000	3,000	5,000	3,000	5,000	3,000	5,000
	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs
Revenue	30	50	60	100	45 0	75.0	90	150
Direct Material A (note 1)	9	15	12	20	4.5	7.5	18	30
Direct Material B (note 2)	6	10	6	10	13.5	22.5	36	60
Direct labour (note 3)	6	10	24	40	22.5	37.5	9	15
Overhead (note 4)	6	8	13	19	11.0	17.0	11	17

Notes

1 Material A was purchased some time ago at a cost of Rs. 5,000 per kg. There are 5,000 kgs in inventory. The costs shown in the flexible budget are based on this historical cost. The material is in regular use and currently has a replacement cost of Rs. 7,000 per kg.

2 Material B is purchased as required; its expected cost is Rs. 10,000 per kg. The costs shown in the flexible budget are based on this expected cost.

3 Direct labour costs are based on an hourly rate of Rs. 10,000 per hour. Employees work the number of hours necessary to meet production requirements.

4 Overhead costs of each product include a specific fixed cost of Rs. 1,000,000 per quarter which would be avoided if the product was to be discontinued. Other fixed overhead costs are apportioned between the products but are not affected by the mix of products manufactured.

GHK has been advised by the only supplier of material B that the quantity of material B that will be available during the next quarter will be limited to 5,000 kgs. Accordingly the company is being forced to reconsider its production plan for the next quarter. GHK has already entered into contracts to supply one of its major customers with the following:

500 units of product G
1,600 units of product H
800 units of product J
400 units of product K

Apart from this, the demand expected from other customers is expected to be

3,600 units of product G
3,000 units of product H
3,000 units of product J
4,000 units of product K

The major customer will not accept partial delivery of the contract and if the contract with this major customer is not completed in full, then GHK will have to pay a financial penalty of Rs. 5,000,000.

Required

(1) For each of the four products, **calculate** the relevant contribution per Rs of material B for the next quarter. **(6 marks)**

(2) It has been determined that the optimum production plan based on the data above is to produce 4,100 units of product G, 4600 units of product H, 800 units of product J, and 2,417 units of product K. **Assess** the amount of financial penalty at which GHK would be indifferent between meeting the contract or paying the penalty. **(6 marks)**

(3) **Calculate** the relevant contribution to sales ratios for each of the four products. **(2 marks)**

(4) Assuming that the limiting factor restrictions no longer apply, **prepare** a sketch of a multi-product profit volume chart by ranking the products according to your contribution to sales ratio calculations based on total market demand. Your sketch should plot the products using the highest contribution to sales ratio first. **(6 marks)**

(LO 3.1.1) **(Total = 20 marks)**

105 NCL

NCL, which has a divisionalised structure, undertakes civil engineering and mining activities. All applications by divisional management teams for funds with which to undertake capital projects require the authorisation of the board of directors of NCL. Once authorisation has been granted to a capital application, divisional management teams are allowed to choose the project for investment.

Under the terms of the management incentive plan, which is currently in operation, the managers of each division are eligible to receive annual bonus payments which are calculated by reference to the return on investment (ROI) earned during each of the first two years by new investments. ROI is calculated using the average capital employed during the year. NCL depreciates its investments on a straight-line basis.

One of the most profitable divisions during recent years has been the IOA Division, which is engaged in the mining of precious metals. The management of the IOA Division is currently evaluating three projects relating to the extraction of substance 'xxx' from different areas in its country of operation. The management of the IOA Division has been given approval by the board of directors of NCL to spend Rs. 24,000 million on one of the three proposals it is considering (ie North, East and South projects).

The following net present value (NPV) calculations have been prepared by the management accountant of the IOA Division.

	North Project		*East Project*		*South Project*	
	Net cash inflow/ (outflow)	*Present value at 12%*	*Net cash inflow/ (outflow)*	*Present value at 12%*	*Net cash inflow/ (outflow)*	*Present value at 12%*
Year 0	(24,000.0)	(24,000.0)	(24,000.0)	(24,000.0)	(24,000.0)	(24,000.0)
Year 1	6,000.0	5,358.0	11,500.0	10,269.5	12,000.0	10,716.0
Year 2	8,000.0	6,376.0	11,500.0	9,165.5	10,000.0	7,970.0
Year 3	13,500.0	9,612.0	11,500.0	8,188.0	9,000.0	6,408.0
Year 4	10,500.0	6,678.0	–	–	3,000.0	1,908.0
NPV		4,024.0		3,623.0		3,002.0

The following additional information concerning the three projects is available:

(1) Each of the above projects has a nil residual value.

(2) The life of the East project is three years. The North and South projects are expected to have a life of four years.

(3) The three projects have a similar level of risk.

(4) Ignore taxation.

Required

(1) Explain (with relevant calculations) why the interests of the management of the IOA Division might conflict with those of the board of directors of NCL. **(10 marks)**

(2) Discuss whether the adoption of residual income (RI) might prove to be a superior basis for the management incentive plan operated by NCL.

(**Note**. No illustrative calculations should be incorporated into your explanation.) **(4 marks)**

The IOA Division is also considering whether to undertake an investment in the West of the country (the West Project). An initial cash outlay investment of Rs. 12,000 million will be required and a net cash inflow amounting to Rs. 5,000 million is expected to arise in each of the four years of the life of the project.

The activities involved in the West project will cause the local river to become polluted and discoloured due to the discharge of waste substances from mining operations.

It is estimated that at the end of year four a cash outlay of Rs. 2,000 million would be required to restore the river to its original colour. This would also clear 90% of the pollution caused as a result of the mining activities of the IOA Division.

The remaining 10% of the pollution caused as a result of the mining activities of the IOA Division could be cleared up by a further cash outlay of Rs. 2,000 million.

Required

(3) Evaluate the West project and, stating your reasons, comment on whether the board of directors of NCL should spend the further Rs. 2,000 million in order to eliminate the remaining 10% of pollution. **(6 marks)**

(**Note**. You should ignore taxation.)

(LO 1.4.1–1.4.6, 2.4.1, 2.4.2) **20 marks**

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106 BDU

BDU Co is a manufacturer of baby equipment and is planning to launch a revolutionary new style of sporty pushchair. The company has commissioned market research to establish possible demand for the pushchair and the following information has been obtained.

If the price is set at Rs. 425, demand is expected to be 1,000 pushchairs, at Rs. 500 it will be 730 pushchairs and at Rs. 600 it will be 420 pushchairs. Variable costs are estimated at either Rs. 170, Rs. 210 or Rs. 260.

A decision needs to be made on what price to charge.

Required

(1) **Prepare** a table showing the expected contribution for each of the nine possible outcomes. **(9 marks)**

(2) **Briefly explain** what is meant by maximax, maximin and minimax regret decision rules, using the information in the scenario to illustrate your explanations. **(5 marks)**

(3) **Explain** the use of expected values and sensitivity analysis and **advise** how BDU could make use of such techniques. **(6 marks)**

(LO 4.1.1, 4.2.1) **(Total = 20 marks)**

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107 Pixie Pharmaceuticals

Pixie Pharmaceuticals is a research-based company which manufactures a wide variety of drugs for use in hospitals. The purchasing manager has recently been approached by a new manufacturer based in a newly industrialised country, offering to produce three of the drugs at their factory. The following cost and price information has been provided.

Drug	*Fairyoxide*	*Spriteolite*	*Goblinex*
Production (units)	20,000	40,000	80,000
	Rs'000	Rs'000	Rs. '000
Direct material cost, per unit	0.80	1.00	0.40
Direct labour cost, per unit	1.60	1.80	0.80
Direct expense cost, per unit	0.40	0.60	0.20
Fixed cost per unit	0.80	1.00	0.40
Selling price each	4.00	5.00	2.00
Imported price	2.75	4.20	2.00

Required

(1) **Calculate** the profit figure the company will make by producing all the drugs itself. **(4 marks)**

(2) **Recommend** to the management whether any drugs should be purchased on the basis of cost only. **(4 marks)**

(3) **Discuss** how your recommendation in (1) above will affect the profit, and by how much. **(2 marks)**

(4) **Explain** the other factors that the management should consider before making a final decision. **(5 marks)**

(5) **Discuss** the factors that have led to a growth in the use of outsourcing. **(5 marks)**

(LO 3.2.1, 3.3.5) **(Total = 20 marks)**

108 Project E

Project E is a strategically important project which the Board of OAP Co have decided must be undertaken in order for the company to remain competitive, regardless of its financial acceptability. It will require an immediate investment of Rs. 5m. The project has a life of four years. Information relating to the future cash flows of this project are as follows:

Year	*1*	*2*	*3*	*4*
Sales volume (units)	12,000	13,000	10,000	10,000
Selling price (Rs. /unit)	450	475	500	570
Variable cost (Rs. /unit)	260	280	295	320
Fixed costs (Rs. '000)	750	750	750	750

These forecasts are before taking into account of selling price inflation of 5.0% per year, variable cost inflation of 6.0% per year and fixed cost inflation of 3.5% per year. The fixed costs are incremental fixed costs which are associated with Project E. At the end of four years, machinery from the project will be sold for scrap with a value of Rs. 400,000. Tax allowable depreciation on the initial investment cost of Project E is available on a 25% straight line basis and OAP Co pays corporation tax of 28% per year, one year in arrears. A balancing charge or allowance is available at the end of the fourth year of operation. The cost of capital is 13%

Required

(1) **Calculate** the nominal after-tax net present value of Project E and comment on the financial acceptability of this project. **(15 marks)**

(2) **Calculate** the sensitivity of the decision in part (1) to changes in sales volume. **(5 Marks)**

(LO 3.3.1, 3.3.2, 4.2.2) **(Total = 20 marks)**

109 SK Plc

SK plc is divided into five divisions that provide consultancy services to each other and to outside customers.

Required

(1) **Discuss** the implications for SK plc, and the consequences for the managers of the supplying and receiving divisions, of the following possible cost-based approaches to setting a transfer price.

(i) Marginal cost
(ii) Opportunity cost **(12 marks)**

(2) **Discuss** whether standard costs or actual costs should be used as the basis for cost-based transfer prices. **(8 marks)**

(LO 2.5.1, 2.5.2) **(Total = 20 marks)**

110 DE Company

The DE Company has two divisions. The following statement shows the performance of each division for the year ended 30 April 20X1:

	D	*E*
	Rs'000	Rs'000
Sales	500,200	201,600
Variable cost	380,400	140,000
Contribution	119,800	61,600
Fixed costs	30,000	20,000
Operating profit	89,800	41,600

Division E manufactures just one type of component. It sells the components to external customers and also to Division D. During the year to 30 April 20X1, Division E operated at its full capacity of 140,000 units. The transfer of 70,000 units to Division D satisfied that division's total demand for that type of component. However the external demand was not satisfied. A further 42,000 components could have been sold to external customers by Division E at the current price of Rs. 1,550.

The current policy of the DE Company is that internal sales should be transferred at their opportunity cost. Consequently during the year, some components were transferred to Division D at the market price and some were transferred at variable cost.

Required

(1) **Prepare** an analysis of the sales made by Division E that shows clearly, in units and in Rs, the internal and external sales made during the year.

(3 marks)

(2) **Discuss** the effect of possible changes in external demand on the profits of Division E, assuming the current transfer pricing policy continues.

(7 marks)

Division E is considering investing in new equipment which would reduce its unit variable costs by 20% and increase its capacity by 10% for each of the next five years. The capital cost of the investment is Rs. 120m and the equipment would have no value after five years. The DE company and its divisional managers evaluate investments using net present value (NPV) with an 8% cost of capital.

External annual demand for the next five years will continue to be 112,000 components at Rs. 1,550 each but the DE Company will insist that the internal annual demand for 70,000 components must be satisfied.

Required

(3) Assuming that the current transfer pricing policy continues:

(i) **Assess** the investment from the perspective of the manager of Division E.

(6 marks)

(ii) **Assess** the investment from the perspective of the DE Company.

(4 marks)

Note. Ignore inflation and taxation.

(LO 2.5.1, 2.5.2) **(Total = 20 marks)**

111 Special Gift Suppliers LLC

Special Gift Suppliers LLC is a wholesale distributor of a variety of imported goods to a range of retail outlets. The company specialises in supplying ornaments, small works of art, high value furnishing (rugs, etc) and other items that the chief buyer for the company feels would have a market. In seeking to improve working capital management, the financial controller has gathered the following information.

	Months
Average period for which items are held in inventory	3.5
Average receivables collection period	2.5
Average payables payment period	2.0

Required

(1) **Calculate** Special Gift Suppliers' funding requirement for working capital measured in terms of months. **(2 marks)**

In looking to reduce the working capital funding requirement, the financial controller of Special Gift Suppliers is considering factoring credit sales. The company's annual turnover is Rs. 2,500m of which 90% are credit sales. Bad debts are typically 3% of credit sales. The offer from the factor is conditional on the following.

1 The factor will take over the sales ledger of Special Gift Suppliers completely.

2 80% of the value of credit sales will be advanced immediately (as soon as sales are made to the customer) to Special Gift Suppliers, the remaining 20% will be paid to the company one month later. The factor charges 15% per annum on credit sales for advancing funds in the manner suggested. The factor is normally able to reduce the receivables' collection period to one month.

3 The factor offers a 'no recourse' facility whereby they take on the responsibility for dealing with bad debts. The factor is normally able to reduce bad debts to 2% of credit sales.

4 A charge for factoring services of 4% of credit sales will be made.

5 A one-off payment of Rs. 25,000,000 is payable to the factor.

The salary of the Sales Ledger Administrator (Rs. 12,500,000) would be saved under the proposals and overhead costs of the credit control department, amounting to Rs. 2,000,000 per annum, would have to be reallocated. Special Gift Suppliers' cost of overdraft finance is 12% per annum. Special Gift Suppliers pays its sales force on a commission only basis. The cost of this is 5% of credit sales and is payable immediately the sales are made. There is no intention to alter this arrangement under the factoring proposals.

Required

(2) **Assess** the proposal to factor the sales ledger by comparing Special Gift Suppliers' existing receivable collection costs with those that would result from using the factor (assuming that the factor can reduce the receivables collection period to one month). **(8 marks)**

(3) As an adviser to Special Gift Suppliers Co, **prepare** a report to the financial controller that outlines:

(i) How a credit control department might function

(ii) The benefits of factoring

(iii) How the financing of working capital can be arranged in terms of short and long term sources of finance

In particular, make reference to:

1 The financing of working capital or net current assets when short term sources of finance are exhausted

2 The distinction between fluctuating and permanent current assets.

(10 marks)

(LO 5.1.1, 5.1.2, 5.2.1) **(Total = 20 marks)**

112 Velm

Velm Co sells stationery and office supplies on a wholesale basis and has an annual turnover of Rs. 4,000 million. All sales are on 40 days' credit with no discount for early payment. Bad debts represent 3% of turnover and Velm Co pays annual interest of 9% on its overdraft. The most recent accounts of the company offer the following financial information:

VELM CO: STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER 20X2

	Rs million	Rs million
Non-current assets		
Tangible non-current assets		17,500
Current assets		
Inventory of goods for resale	900	
Receivables	550	
Cash	120	
		1,570
Total assets		19,070
Equity and liabilities		
Ordinary shares	3,500	
Reserves	11,640	
		15,140

	Rs million	Rs million
Non-current liabilities		
12% Bonds due 20Y0		2,400
Current liabilities		
Trade payables	330	
Overdraft	1,200	
		1,530
Total equity and liabilities		19,070

Velm Co is considering offering a discount of 1% to customers paying within 14 days, which it believes will reduce bad debts to 2.4% of turnover. The company also expects that offering a discount for early payment will reduce the average credit period taken by its customers to 26 days. Two-thirds of customers are expected to take advantage of the discount.

Required

(1) **Discuss** the relative merits of short-term and long-term debt sources for the financing of working capital. **(6 marks)**

(2) **Discuss** the different policies that may be adopted by a company towards the financing of working capital needs and indicate which policy has been adopted by Velm Co. **(7 marks)**

(3) **Summarise** the advantages to a company of taking steps to improve its working capital management, giving examples of steps that might be taken. **(7 marks)**

(LO 5.1.2, 5.1.3, 5.2.1) **(Total = 20 marks)**

113 PNC

PNC is a distribution company which buys a product in bulk from manufacturers, repackages the product into smaller packs and then sells the packs to retail customers.

PNC's customers vary in size and consequently the size and frequency of their orders also varies. Some customers order large quantities from PNC each time they place an order. Other customers order only a few packs each time.

The current accounting system of PNC produces very basic management information that reports only the overall company profit. PNC is therefore unaware of the costs of servicing individual customers. However, the company has now decided to investigate the use of Customer Profitability Analysis (CPA).

PNC would like to see the results from a small sample of customers before it decides whether to fully introduce CPA.

The information for two customers, and for the whole company, for the previous period was as follows:

	Customer B	*Customer D*	*Total for Company*
Factory contribution (Rs'000s)	75	40.5	450
Number of:			
Packs sold (000)	50	27	300
Sales visits to customers	24	12	200
Orders placed by customers	75	20	700
Normal deliveries to customers	45	15	240
Urgent deliveries to customers	5	0	30

Activity costs:	Rs'000s
Sales visits to customers	50
Processing orders placed by customers	70
Normal deliveries to customers	120
Urgent deliveries to customers	60

Required

(1) Prepare a Customer Profitability Analysis for each of the two customers. **(6 marks)**

(2) Explain how PNC could use Customer Profitability Analysis to increase its profits. **(4 marks)**

(LO 1.3.2) **(Total = 10 marks)**

114 Fortune

Fortune Llc makes and sells two products, A and B, each of which passes through the same automated production operations. The following estimated information is available for period 1.

- **Product unit data**

	A	**B**
Direct material cost (Rs.)	20	400
Variable production overhead cost (Rs.)	280	40
Overall hours per product unit (hours)	0.25	0.15

- Original estimates of production/sales of products A and B are 120,000 units and 45,000 units respectively.
- The selling prices per unit for A and B are Rs. 600 and Rs. 700, respectively.
- Maximum demand for each product is 20% above the estimated sales levels.
- Total fixed production overhead cost is Rs. 14,700,000. This is absorbed by products A and A at an average rate per hour based on the estimated production levels.

One of the production operations has a maximum capacity of 3,075 hours which has been identified as a bottleneck which limits the overall estimated production/sales of products A and B.

The bottleneck hours required per product unit for products A and B are 0.02 and 0.015 respectively.

Required

(1) **Calculate** the mix (in units) of products A and B which will maximise net profit and the value (in Rs.) of the maximum net profit. **(6 marks)**

(2) Fortune Llc has now decided to determine the profit-maximising mix of products A and A based on the throughput accounting principle of maximising the throughput return per production hour of the bottleneck resource.

Given that the variable overhead cost, based on the value (in Rs.) which applies to the original estimated production/sales mix, is now considered to be fixed for the short/intermediate term:

(i) **Calculate** the mix (of units) of products A and B which will maximise net profit and the value of that net profit. **(6 marks)**

(ii) **Calculate** the throughput accounting ratio for product B. **(3 marks)**

(iii) Comment on the interpretation of throughput accounting ratios and their use as a control device. You should refer to the ratio for product A in your answer. **(5 marks)**

(LO 1.3.1, 1.3.2) **(Total = 20 marks)**

115 Ace Airline

Ace Airline (Ace) is the national airline of Aceland. The airline's objective is to be the best premium global airline.

Ace provides long- and short-haul services all over the world and is based at its hub at Acecity airport. Ace has been hit by a worldwide reduction in air travel due to poor economic conditions. The most recent financial results show a loss and this has caused the board to reconsider its position and take action to address the changed environment.

Ace has cut its dividend in order to conserve cash and it is trying to rebuild profitability by reducing costs by 14%. The airline is capital intensive as it needs to maintain a large fleet of modern aircraft. The two major costs for the airline are staff and fuel. In trying to renegotiate working conditions and pay, the management have angered the unionised workforce. There has already been some strike action by the unions representing the aircraft crew and ground staff and more is threatened.

Additionally, the board is pushing forward a large project to improve the design of the company website in order to increase the number of passengers who check in online and so would not require as much assistance at the airport. The new design is also aiming to increase the number of passengers who book their tickets through the company's website rather than other resellers' websites or at booking agents.

The board has also been considering taking advantage of new technology in aircraft engines by making a large investment (Rs'000s 450m) in new low-noise, fuel-efficient aircraft in an effort to reduce the environmental complaints surrounding air travel and also cut costs.

Performance analysis

The Chief Executive Officer (CEO) has provided the data for Ace and two of its main competitors (shown in Appendix 1). Beeland Air is a government-owned and run airline in the neighbouring country of Beeland. It has a similar mix of business to Ace and targets a similar market. Cutprice Air is currently one of the most successful of the new privately owned airlines that have gained significant market share over the last 15 years by offering a cheap but basic short-haul service to customers in and around Aceland. Cutprice Air subcontracts many of its activities in order to remain flexible. The CEO wants you to calculate some suitable performance measures and explain the results.

Big Data

The CEO believes that Ace could be making more use of Big Data. He has recently returned from a conference about 'Big Data in the Airline Industry' where one of the speakers talked about the benefits of Big Data in relation to four key areas:

- Identifying trends in passenger demand and using this to set prices
- Understanding and influencing the customer's selection process (in particular reducing the number of potential customers who start booking a flight online but do not go on to complete the transaction)
- Boosting revenue from in-flight sales by optimising the on-board store for individual flights
- Understanding customer sentiment and improving customer satisfaction

Ace currently offers the same selection of in-flight products on all its flights.

The CEO has asked you to explain how using Big Data in these four areas could help Ace improve its performance. However, he also wants to understand the potential implications that using Big Data could have for Ace's management information systems, given that a number of Ace's IT staff are already working on the website upgrade project.

Data provided by the CEO:

Data for the most recent calendar year

		Ace Airline	*Beeland Air*	*Cutprice Air*
Passengers ('000)		23,649	38,272	35,624
Passenger kilometres (millions)		79,618	82,554	40,973
Revenue	Rs'm	5,430	7,350	2,170
Costs				
Fuel	Rs'm	1,480	1,823	535
Staff	Rs'm	1,560	2,998	238
Staff numbers		32,501	56,065	5,372
Operating profit	Rs'm	630	54	127
Number of aircraft		182	361	143
Average aircraft size (seats)		195	163	125
Seat kilometres (millions)		100,654	105,974	46,934

Note. A seat kilometre is generated for every one kilometre flown by an **available** seat on the company's aircraft.

Required

(1) Using the data provided, **analyse** the three airlines using appropriate performance indicators and comment on your results. **(10 marks)**

(2) **Explain** how Big Data could be used to help Ace Airline's performance, in relation to the four key areas identified at the conference. **(6 marks)**

(3) **Discuss** the potential implications of Big Data for Ace Airline's management information systems. **(4 marks)**

(LO 2.3.6, 3.5.1, 3.5.2) **(Total = 20 marks)**

116 Expanse

Expanse Llc is considering a major investment involving five possible projects and the board of directors has prepared the following estimated cash flows and the net present values at 31 December 20X9 for the five projects:

Project	*Investment on 31/12/X9*	*Year to 31/12/Y0*	*Year to 31/12/Y1*	*Year to 31/12/Y2*	*NPV*
	Rs'000	Rs'000	Rs'000	Rs'000	Rs'000
A	(4,150)	(1,290)	530	7,270	577
B	(3,870)	(1,310)	3,130	1,550	(1,309)
C	(6,400)	1,770	2,160	3,160	(632)
D	(5,000)	(2,610)	6,450	6,520	2,856
E	(4,600)	1,290	2,870	3,620	1,664

Due to financial constraints, the company, if successful with its tenders, would be unable to take on all five projects. The board is prepared to release Rs. 8 million for initial investment (on 31 December 20X9) into one or more of the projects, but might increase this figure to Rs. 9 million if there are grounds for doing so.

An alternative scenario which has been considered would be to make available sufficient funds to start all five projects in December 20X9, but this would limit the capital available in the year to 31 December 20Y0 to a maximum of only Rs. 500,000.

Also, On 31 December 20X9, Expanse Llc will be replacing its three existing machines with a brand new machine. The managing director wishes to know whether to replace these new machines every one, two or three years from now on. He has provided the following background information for the machine asset replacement:

1 Each new machine will cost Rs. 110,000.

2 Resale values for each machine (assumed to be received in cash on the last day of the year to which they relate) are estimated to be Rs. 70,000 after one year, Rs. 42,000 after two years and Rs. 18,000 after three years.

3 Annual running costs for each machine (assumed to be paid on the last day of the year to which they relate) are estimated at Rs. 66,000 in the first year of ownership, Rs. 76,000 in the second year and Rs. 92,000 in the third year.

4 The subsidiary company uses a discount rate of 10% in its appraisal of such investments.

5 For the purposes of the advice to be given to the managing director, taxation and inflation can be ignored.

Requirement

(1) Assuming that all of the projects are divisible, and;

(i) Assuming that Expanse Llc has no capital rationing, **advise** its directors as to which projects should be accepted **(1 mark)**

(ii) Assuming that the directors are prepared to spend a maximum of Rs. 8 million on 31 December 20X9, **advise** them as to which projects should be accepted **(2 marks)**

(iii) Assuming that the directors are prepared to make available sufficient funds to start all five projects on 31 December 20X9, but only Rs. 500,000 on 31 December 20Y0, **advise** them as to which projects should be accepted. **(3 marks)**

(2) Using appropriate calculations, **advise** the directors of Expanse Llc of the optimal replacement policy for these new machines. **(4 marks)**

(LO 3.3.3, 3.3.4) **(Total = 10 marks)**

117 TickTock

Task 1

TickTock Llc is considering an opportunity to produce an innovative component which, when fitted into motor machine engines, will enable them to utilise fuel more efficiently. The component can be manufactured using Process Alpha. Although this is an entirely new line of business for TickTock, it is of the opinion that developing either process over a period of four years and then selling the productions rights at the end of four years to another company may prove lucrative. The annual after-tax cash flows for each process are as follows:

Year	*0*	*1*	*2*	*3*	*4*
After-tax cash flows (Rs'000s)	(3,800)	1,220	1,153	1,386	3,829

Task 2

TickTock has estimated an annual standard deviation of Rs. 800,000 on one of its other projects, based on a normal distribution of returns. The average annual return on this project is Rs. 2,200,000.

Required

(1) For Task 1, calculate the internal rate of return (IRR) and the modified internal rate of return (MIRR) for Process Alpha. **(4 marks)**

(2) For Task 2, estimate the project's Value at Risk (VAR) at a 99% confidence level for one year and over the project's life of five years. Explain what is meant by the answers obtained. **(4 marks)**

(3) ~~Provide an explanation of~~ how simulations, such as the Monte Carlo simulation, could be used to assess the volatility of the net present value of this project. **(4 marks)**

(4) Briefly explain any other methods, not yet discussed, that can use to deal with risk and uncertainty in investment appraisal and their drawbacks. **(4 marks)**

(5) Explain the TARA likelihood versus consequences risk management framework to the directors of TickTock. **(4 marks)**

(LO 3.3.5, 4.2.3, 4.2.4, 4.3.1, 4.3.2) **(Total = 20 marks)**

118 ABC

ABC Llc offers four services to television companies. The number of services provided is measured in service units and details of ABC Llc's draft budget for its year ending 30 June 20X9 are as follows.

	Service W	*Service X*	*Service Y*	*Service Z*
Number of service units	1,000	2,300	1,450	1,970
Selling price per service unit (Rs'000s)	18	16	12	20
Variable cost per service unit (Rs'000s)	8	10	13	13
Fixed cost per service unit (Rs'000s)	2	3	2	4

The budgeted level of activity shown in the table above has been based on fully meeting the forecasted market demand for each type of service.

Further investigation into the nature of the fixed costs has shown that some of those shown in the original budget are incurred as a direct result of providing specific services as follows.

	Rs'000s
Service W	4,400
Service X	3,700
Service Y	Zero
Service Z	2,650

The remaining budgeted fixed costs are general fixed costs that will be incurred regardless of the type and number of services provided.

ABC Llc entered into a three-year contract in June 20X9 which requires it to provide 500 units of service Y per year or suffer significant financial penalties. These services are included in the budgeted demand.

Required

(1) Calculate the overall budgeted contribution and profit and evaluate the financial viability of each of the four services currently provided. **(7 marks)**

(2) Recommend the operating plan that will maximise profit for the year ended 30 June 20X9 and state the resulting profit. Explain the assumptions that led to your decision and other factors that should be considered. **(5 marks)**

(3) Calculate the overall breakeven sales value for the operating plan you have recommended in answer to part (b), stating clearly the assumptions made in your calculations. **(4 marks)**

(4) Comment on any limitations of using breakeven analysis for decision making purposes. **(4 marks)**

(LO 3.1.3, 3.2.1) **(Total = 20 marks)**

119 Bandara Ltd

Bandara Ltd is a manufacturing company but faces a very seasonal demand.

They are considering two short term capacity modification strategies; one is to introduce overtime working and the other is to vary inventory.

The following information is available the following months in 2x02021.

	September	*October*	*November*	*December*
Demand forecast	3,000	4,000	1,500	4,000
Standard Labour hours available	3,250	3,250	3,250	3,250

Other information is as follows:

Opening stock – -September 300 units

Labour hours required 1 hrs/unit

Standard Labour cost/hour (Rs.)200

Overtime Labour cost/hour (Rs.) 300

Stock holding cost/per unit-per month (Rs.)15

Stock out cost/unit (Rs.) 20

Closing stock requirement is 10% of next month's demand

Required:

Evaluate the following options for the quarter ending March ~~2x21020~~ and recommend the best course of action.

(Option A): The Company uses overtime to meet the short-term capacity requirement.

(Option B): Company changes the stock level while avoiding overtime.

(Total 10 marks)

(LO 2.2.3)

120 Robust Laptops

Robust Laptops Co (RL) makes laptop computers for use in dangerous environments. The company's main customers are organisations like oil companies and the military that require a laptop that can survive rough handling in transport to a site and can be made to their unique requirements.

The company started as a basic laptop manufacturer but its competitors grew much larger and RL had to find a niche market where its small size would not hinder its ability to compete. It is now considered one of the best quality producers in this sector.

RL had the same finance director for many years who preferred to develop its systems organically. However, due to a fall in profitability, a new chief executive

officer (CEO) and a new chief financial officer (CFO) have been appointed. The CEO wishes to review RL's financial control systems in order to get better information with which to tackle the profit issue.

The CEO wants to begin by thinking about the pricing of the laptops to ensure that selling expensive products at the wrong price is not compromising profit margins. The laptops are individually specified by customers for each order and pricing has been on a production cost plus basis with a mark-up of 45%. The company uses an absorption costing system based on labour hours in order to calculate the production cost per unit.

The main control system used within the company is the annual budget. It is set before the start of the financial year and variances are monitored and acted upon by line managers.

More generally, the CEO is concerned about the performance information which is provided in the monthly board papers. The board papers contain a high level summary of financial information, comparing performance against budget for revenue, costs and profit. They also report RL's KPIs which are: profit, profit margin, free cashflow and return on capital employed.

Although the CEO acknowledges that the fall in profitability is a concern for RL, he believes that the company's performance measurement systems should not focus solely on financial information. Instead, he wants RL to identify its objectives and its critical success factors, and then link its KPIs to them.

Financial and other information for Robust Laptops

Data for the year ended 30 September 20X1

Volume (units)	23,800	
		Total Rs. Million
Direct variable costs		
Material		40,650
Labour		3,879
Packaging and transport		2,118
Subtotal		46,647
Overhead costs		
Customer service		7,735
Purchasing and receiving		2,451
Inventory management		1,467
Administration of production		2,537
Subtotal		14,190
Total		60,837

Labour time per unit	3 hours	
Data collected for the year		
No of minutes on call to customer	899,600	
No of purchase orders raised	21,400	
No of components used in production	618,800	
Order 11784		
Units ordered	16	
Direct costs for this order:		Rs'000
Material		27,328
Labour		2,608
Packaging and transport		1,424
Other activities relating to this order:		
No of minutes on call to customer	1,104	
No of purchase orders raised	64	
No of components used in production	512	
Administration of production (absorbed as general overhead)	3 Labour hours per unit	

Required

(1) Evaluate ~~of~~ the current method of costing against an Activity Based Costing (ABC) system. You should provide illustrative calculations using the information provided on the costs for 20X1 and for Order 11784. Briefly state what action management might take in the light of your results with respect to this order. **(16 marks)**

(2) Discuss the benefits of applying Activity Based Management for Robust Laptops. **(4 marks)**

(LO 1.2.1, 1.2.6)

Answers

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SECTION 1

1 The correct answer is: All of the above.

A product's life cycle costs are incurred from its design stage through development to market launch, production and sales, and finally to its eventual decline and withdrawal from the market.

2 The correct answer is: Both are true

A system of environmental management accounting provides environmental information for internal use by management, but not for external reporting. It is distinct from environmental accounting, which is concerned with external reporting (as well as internal reporting). Environmental management accounting systems typically make use of life cycle costing, given that there may be substantial clean-up and disposal costs at the end of the life of an activity or operation.

3 The correct answer is: The cost driver for materials handling and despatch costs is likely to be the number of orders handled.

'The cost driver for quality inspection is likely to be batch size' is incorrect. The cost driver for quality inspection costs is likely to be either the number of units produced or the number of batches produced, depending on whether quality inspection is linked to batches produced or total production output. The batch size is not a factor that drives total inspection costs.

'In the short run, all the overhead costs for an activity vary with the amount of the cost driver for the activity' is incorrect. Some costs of activities may vary with the volume of the activity, but other costs of the activity will be fixed costs. '-A cost driver is an activity based cost' is incorrect. A cost driver is not the cost itself; it is a measure of the volume or quantity of an activity.

4 The correct answers are:

- 'In a system of ABC, for costs that vary with production levels, the most suitable cost driver is likely to be direct labour hours or machine hours' and
- 'Activity based costing is a form of absorption costing'.

Implementation of ABC is likely to be cost effective when variable production costs are a low proportion of total production costs; and when overhead costs, traditionally assumed to be fixed costs, are a large proportion of total production costs.

At a unit level, the cost driver for production-related overheads is likely to be direct labour hours or machine hours.

It is a mistake to associate activity-based costs with the variable costs of an activity. Some of the costs may be variable in the short run, but others are not. So ABC costs should **not** be treated as relevant costs for the purpose of short-term decision making. It is more appropriate to think of ABC as a form of absorption costing, where overheads are allocated to activities and products on a more meaningful basis than with traditional absorption costing.

5 The correct answer is: Contingent cost

The US Environment Protection Agency in 1998 suggested classifying environmental costs into four types: conventional costs, hidden costs (costs hidden because they are included in general overheads and not identified separately), contingent costs and image and relationship costs.

6 The correct answers are: 'The majority of environmental costs are already captured within a typical organisation's accounting system. The difficulty lies in identifying them' is **true**. 'Input/output analysis divides material flows within an organisation into three categories: material flows; system flows; and delivery and disposal flows' is **false**.

Statement 2 refers to flow cost accounting rather than input/output analysis. Under the flow cost accounting technique, material flows within an organisation are divided into three categories: material flows; system flows; and delivery and disposal flows.

7 The correct answer is: Products should be discontinued if there is a target cost gap.

If there is a target cost gap that cannot be eliminated, management may consider whether or not to continue with the product, since it will not be achieving the required profit margin. However, a decision to discontinue a product, or whether to continue making it, should not be based on target costs or profit margins alone. Therefore the statement 'Products should be discontinued if there is a target cost gap' is NOT true and this is the correct answer.

For services that have a large fixed cost base, other methods of cost control may be more appropriate, such as activity-based management, and a key to reducing costs is often increasing sales volumes rather than reducing expenditure. To achieve a target cost, one approach is to remove design features from a product specification that do not add value for customers (so do not affect the price that customers are willing to pay).

8 The correct answer is: (i), (ii) and (iii)

Environmental failure costs are costs incurred as a result of environmental issues being created either internally or outside the company. These can be financial or societal costs. Compensation, penalties and air pollution are all environmental failure costs.

9 The correct answers are:

- ABC recognises the complexity of modern manufacturing by the use of multiple cost drivers
- ABC establishes separate cost pools for support activities

Reapportionment of service centre costs is not done via ABC specifically. It would instead be done via the direct, step or reciprocal method under traditional absorption costing. If ABC is used to allocate costs it uses the cost driver approach, where costs are allocated to a cost pool and a cost driver is used to allocate to a product.

ABC is an appropriate system if overheads are high relative to prime costs and when there is significant diversity in the product range. If overheads could be allocated based solely on production time then traditional AC would be fine.

10 The correct answers are:

- Set up costs
- Raw material handling costs

These two costs are likely to increase, as batch sizes get smaller.

Remember, the whole aim of JIT is to hold no inventory. Thus raw material storage costs should fall, not rise. Customer order costs will not be changed by the introduction of JIT.

11 The correct answer is: The benefits obtained from ABC might not justify the costs.

Some companies find the costs of implementing ABC to be prohibitive. If Triple Llc believes that the difference in cost per unit of each product under ABC and traditional based costing systems is not material, it should not adopt ABC.

Distracters:

- ABC can be applied to all overheads, not just production overheads.
- The cost per unit provided under ABC principles will be more accurate.
- ABC costing will provide much better insight into what drives overhead costs.

12 The correct answer is:

Product A: 450,000 metres
Product B: 450,000 metres
Product C: 562,500 metres

Output capacity for each process

Total processing hours for the factory = 225,000

	Product A	*Product B*	*Product C*
	Metres	Metres	Metres
Pressing	225,000/0.50 = 450,000	225,000/0.50 = 450,000	225,000/0.40 = 562,500

13 The correct answer is: Statement 1 is true and statement 2 is false

The main disadvantages of ABC are that it is costly and time consuming to operate.

14 The correct answer is: At the design and development stage

Research has shown that, for organisations operating within an advanced manufacturing technology environment, approximately 90% of a product's life-cycle cost is determined by decisions made early within the life cycle. In such an environment there is therefore a need to ensure that the tightest cost controls are at the design stage, because the majority of costs are committed at this point.

15 The correct answer is: Statement 2 only

A price in excess of full cost per unit will not necessarily ensure that a company will cover all its costs and make a profit. Making a profit with cost plus pricing also depends on working at a sufficient capacity level, so that all fixed costs are covered by sales revenue.

Cost plus pricing is an appropriate pricing strategy when there is no comparable market price for the product or service.

16 The correct answer is: Opportunity cost

The question provides a definition of opportunity cost. An opportunity cost is a relevant cost for the purpose of decision making, but the definition in the question is too narrow to fit the term 'relevant cost'.

17 The correct answer is: Rs. 2,750,000

	FP1	*FP2*	*Total*
Input to further processing (kg)	5,500	4,000	
Finished output (kg)	4,950	3,800	
	Rs000	Rs000	Rs000
Revenue from sales of FP1/FP2	44,550	34,200	
Relevant further processing costs	(11,000)	(12,000)	
Revenue from sales of CP1/CP2	(33,000)	(20,000)	
	550	2,200	2,750

18 The correct answer is: Simulation modelling

A unique feature of simulation modelling using the Monte Carlo method is the use of random numbers to determine the value of input variables to the model.

19 The correct answers are:

- Demand is perfectly inelastic
- There is no change in the quantity demanded, regardless of any change in price

Demand is perfectly inelastic (that is, price elasticity is zero) when price changes have no impact upon demand.

The formula for the price elasticity of demand is percentage change in demand divided by percentage change in price; it will equal zero only if demand remains unchanged. A perfectly inelastic demand curve is a vertical straight line.

20 The correct answer is: Price discrimination

Price discrimination involves charging different prices in two or more different markets. This is only effective when the markets can be kept entirely separate – such as charging different prices for different age groups (children and old age pensioners), or charging a different price for a product or service at different times of the day or week.

21 The correct answer is: Sensitivity analysis

The 'What if' refers to the type of question used in sensitivity analysis. For example, what if the volume of sales is 10% less than expected? What if variable unit costs are 5% more than expected?

22 The correct answer is: Rs. 4.00

If one extra direct labour hour is available, the optimal solution will change to the point where:

(1): direct labour hours	2x + 4y	=	10,001
(2): materials	4x + 2y	=	14,000
Multiply (1) by 2			
(3)	4x + 8y	=	20,002
Subtract (2) from (3)	6y	=	6,002
	y	=	1,000.333
Substitute in (2)	4x + 2,000.667	=	14,000
	x	=	2,999.8333

Total contribution = Rs.(2,999.833 × Rs. 12,000) + Rs.(1,000.333 × Rs. 18,000) = Rs. 35,998,000 + Rs. 18,006,000 = Rs. 54,004,000

Total contribution in original solution = Rs.(3,000 × Rs. 12,000) + Rs.(1,000 × Rs. 18,000) = Rs. 54,000,000

The shadow price per direct labour hour is therefore Rs. 54,004,000 – Rs. 54,000,000 = Rs. 4,000

23 The correct answers are:

- If the aim is to minimise costs, the solution is where the total cost line touching the feasible area at a tangent is as close to the origin as possible.
- If the aim is to maximise profit, the solution is where the total contribution line touching the feasible area at a tangent is as far away from the origin as possible.

If the aim is to minimise costs, the solution is where the total cost line touching the feasible area at a tangent, is as close to the origin as possible as this will allow the company to make as little as possible given constraints. If the aim is to maximise profit, the solution is where the total contribution line touching the feasible area at a tangent, is as far away from the origin as possible as this will allow the company to make as much as possible given constraints.

All other statements are false.

24 The correct answers are:

- Market research
- Focus groups

Market research is used to obtain data about customer/consumer attitudes and preferences to products or markets, and the quantitative or qualitative information obtained from market research can help to reduce uncertainty for some elements of decision making, such as pricing and product design decisions.

Like market research, focus groups reduce uncertainty by providing information and the information will influence decisions such as pricing decisions.

25 The correct answer is: It is difficult to identify a standard item for costing

With road haulage and distribution, drivers' times on the road are measured automatically. Variable costs can be high (labour and fuel, for example). Standard costing is more common in manufacturing but in principle can be applied to service industries. The problem is to identify a standard item for which a cost can be measured and variances subsequently calculated. In road haulage, for example, a standard measure may be cost per tonne/kilometre delivered: this does not lend itself easily to variance analysis.

26 The correct answers are:

- This standard makes allowances for expected wastage and inefficiencies.
- This standard should give employees a realistic, but challenging target of efficiency.

The least useful, and most rarely used, type of standard is the basic standard, which is kept unaltered over a long period of time and may be out of date. The standard that is based on perfect operating conditions is the ideal standard which makes no allowances for wastage or inefficiencies.

27 The correct answer is: Material usage operational variance

Material usage is within the control of a production manager, whereas material price variances are usually the responsibility of the purchasing manager. Line managers are responsible for operational variances, but planning variances are commonly assumed to be the responsibility of someone in senior management.

28 The correct answer is: Both statement 1 and statement 2

Flexible budgets enable actual results to be compared with expected results for the same volume of activity, such as production and sales. To reconcile an original budgeted profit to actual profit with variances there must be a sales volume variance (measured in terms of either budgeted/standard contribution or profit, depending on the type of costing system used).

29 The correct answers are:

- For standard costing to be useful for control purposes, it requires a reasonably stable environment.
- The ethos behind a system of standard costing is that performance is satisfactory if it meets predetermined standards.

In a standard costing environment, products or processes must be standardised and repetitive, so that standards can be established for budgeting and control. In a TQM environment, the objective is continuous improvement, which may involve continuous changes in procedures, input quantities and prices. A stable standard is never achieved.

Standard costing assumes that there is a target level of performance and achieving that target represents success. With TQM the view is that performance can be improved continually. There is no 'target'.

30 The correct answer is: Neither statement 1 nor statement 2

Mix and yield variances measure costs and output quantities, not quality. A potential problem is that persistent **favourable** mix variances may have an adverse effect on sales volume variances and direct labour efficiency variances, because the cheaper materials mix may affect the quality of the product sold to customers and also make the product more difficult to handle. These consequences could lead to adverse sales volume and labour efficiency variances.

31 The correct answer is: Rs. 1,325,000

	Budgeted sales	*Std profit*	*Budgeted profit*
	Units	Rs'000 per unit	Rs'000
X	800	10	8,000
Y	1,000	6	6,000
Z	600	12	7,200
	2,400		21,200

Weighted average standard profit per unit = Rs. 21,200,000/2,400 = Rs. 8,833.3

Quantity variance in units = 2,400 – 2,250 = 150 units (A)

Quantity variance in $ (standard profit) = 150 (A) × Rs. 8,833.3 = Rs. 1,325,000 (A)

32 The correct answers are:

Employees will focus on eliminating wasteful expenditure.	**TRUE**	
Short-term benefits could be emphasised over long-term benefits.	**TRUE**	

Zero-based budgeting begins by looking at the minimum budgeted expenditure, and building a budget from this zero base. This encourages employees to focus on wasteful and unnecessary spending.

However the focus is on short-term savings and may give insufficient consideration to longer-term benefits of current spending.

33 The correct answer is: Rs. 59 million

	Rs'000
Total cost at 1,200 units	66,600
Deduct step increase in fixed costs	(6,000)
Total cost at 1,200 units excluding step cost increase	60,600
Total cost of 900 units	58,200
Therefore variable cost of 300 units	2,400

Variable cost per unit = Rs. 8,000

	Rs'000
Total cost of 900 units	58,200
Variable cost of 900 units (at 8,000 each)	7,200
Therefore fixed costs at this level of output	51,000

Total costs of 1,000 units = Rs. 51 million + Rs. (8,000 × 1,000) = Rs. 59,000

34 The correct answer is: Rs. 700,000 favourable

In order to get to the answer, the relationship between variances needed to be considered. The total material cost variance (Rs. 4,900,000 adverse) = Material price variance (Rs. 4,800,000 adverse) + material usage variance. Therefore the material usage variance is the balancing figure of Rs. 100 adverse. The material usage variance = material mix variance + material yield variance. We now have to calculate the material mix variance (in order to replace in the equation above) from the information given in the question as shown in the table below:

Material	*Std ratio*	*Actual quantity Std mix*	*Actual quantity Actual mix*	*Variance* Litres	*Standard cost per litre* Rs '000	*Variance* Rs '000
R		1,800	1,900	100 (A)	63	6,300 (A)
S		3,000	2,800	200 (F)	50	10,000 (F)
T		1,200	1,300	100 (A)	45	4,500 (A)
			6,000			800 (A)

Therefore, the material mix variance is Rs. 800 adverse. As stated above, the material usage variance (Rs. 100 adverse) = material mix variance (Rs. 800 adverse) + material yield variance. Therefore the material yield is Rs. 700 Favourable (balancing figure)

Selecting 'Rs. 800 adverse', Rs. 800 adverse is the material mix. This does not answer the question and hence this is not the correct answer.

Selecting 'Rs. 800 favourable', Rs. 800 favourable is the material mix variance but the adverse variances were incorrectly recorded as favourable and vice versa.

Selecting 'Rs. 900 adverse' meant if the material mix is incorrectly calculated as Rs. 800 favourable, then we would get the material yield as Rs. 900 adverse. Hence, this is not the correct answer.

35 The correct answer is: Rolling budget

If it is difficult to forecast or plan costs and revenues accurately for more than three months ahead, it would be appropriate to prepare new annual budgets every three months, giving most emphasis to the budget for the next three-month period. The disadvantage is that this would require four annual budgets in every 12-month period.

36 The correct answer is: 1.442 hours

$Y = ax^b$

$b = \log 0.75/\log 2 = -0.1249/0.3010 = -0.415$

When $x = 6$, $x^{-0.415} = 1/6^{-0.415} = 0.4754$

Average time for six jobs:

$Y = 5 \times 0.4754 = 2.377$ hours

Total time required for six jobs = 6×2.377 hours = 14.262 hours

Average time for five jobs: $5 \times 5^{-0.415} = 2.564$ hours

Total time required for five jobs = 5×2.564 hours = 12.820 hours

Time required to perform the 6th job = Total time required for six jobs – Total time required for five jobs.

Therefore, time required to perform the 6th job = 14.262 hours – 12.820 hours = 1.442 hours

37 The correct answer is: Rs. 1,248,000

Standard yield from actual input of materials at standard cost: Rs. 19,552,000

Actual yield at standard materials cost: Rs. 20,800,000

Mix variance (19,552,000 – 20,800,000): Rs. 1,248,000 (F)

38 The correct answer is: Statement 2 only.

Mix variances should only be calculated when a product contains two or more materials that can be mixed together in different proportions. For example, calculating a mix variance for the production of a bicycle out of its component parts would be meaningless. It is important to be aware of the interdependence between variances: a favourable mix variance – meaning a cheaper mix of materials in a product – may result in adverse total output of the product (adverse yield).

39 The correct answer is: Sales mix variance

The loss of the advertising campaign means that sales of Product Y will be less than budgeted, which should lead us to expect adverse sales volume variance for Y and an adverse sales quantity variance for both products together. The price discounting for Product Y should lead us to expect an adverse sales price variance. The increase in the proportion of Product X units sold in the total sales mix should lead us to expect a favourable sales mix variance, because Product X has a bigger standard contribution, both per unit and per Rs. 1,000 of standard sales price, than Product Y.

40 The correct answer is: Rs. 14,750

Product	*Actual sales*	*Actual sales in std mix*	*Sales mix variance*	*Std profit*	*Sales mix variance*
	Units	Units	Units	Rs.	Rs.
X	700	750.0	50.0 (A)	10	500 (A)
Y	1,200	937.5	262.5 (F)	6	1,575 (F)
Z	350	562.5	212.5 (A)	12	2,550 (A)
	2,250	2,250.0	0		1,475 (A)

41 The correct answer is: Managers should be held accountable only for costs and revenues over which they have some influence or control

This should be a fundamental principle of management control, but it is not always applied in practice.

42 The correct answer is: Rs. 4,000 Newsletter

	Kg
120 units of product should use (× 3.50)	420
They did use	410
Operational usage variance in kg	10 (F)

Operational usage variance in Rs. (× Standard price per kg Rs. 400)
= Rs. 4,000 (F)

43 The correct answer is: Neither statement 1 nor statement 2

Learning curves are more difficult to apply in teams with a high labour turnover, as it can affect efficiency and knowledge significantly. Learning rates are affected by time gaps between the production of additional units of a product, because acquired learning may be forgotten with the passage of time unless the work continues regularly.

44 The correct answers are:

- Control reports are provided too late
- Targets are not communicated

If targets are too easy, they cannot provide an incentive, but they cannot be a disincentive either.

If targets are set at high levels that cannot realistically be achieved, this can be demotivating. Demotivation can also occur if targets are imposed by senior management however this can be overcome if budgets are prepared on a bottom-up basis. Management will also be demotivated if control reports are provided late so that the manager responsible is unable to take prompt action to deal with problems that may arise.

45 The correct answer is: It is easier to put public sector activities into decision packages because they are more easily definable than in the private sector.

In an article in *Student Accountant* on incremental budgeting and zero-based budgeting, the ACCA examining team described two reasons why ZBB is often considered more suitable for public sector service organisations than for private sector companies. One is that ZBB is more suited to costs where there is a lot of discretionary spending, as in the public sector services. The second reason is that activities of public sector organisations are more easily definable and so can usually be put into decision packages. (For example, the activities of a local authority can be grouped into packages for local housing, local education, local refuse collection and waste disposal, and so on.)

46 The correct answers are:

- There is often no measurable output from service functions
- The activities of many service functions are of a non-standard nature

The output of services functions is not as easily measurable as it is with goods which are physically manufactured. This makes it difficult to establish standard unit rates, because there are no easily available standard times or usages.

47 The correct answer is:

- The quantity of work achievable at standard performance in an hour

This is the definition of a standard hour.

48 The correct answer is: Both statement 1 and statement 2

Internal transfers should be preferred to external purchases because the company will have better control over output quality from Division A and the scheduling of production and deliveries. Transfer prices determine how total profit will be shared between the divisions.

49 The correct answer is: Rs. 15,000

The minimum transfer price is a price that should be sufficient to make the manager of Division A wiling to transfer units of Component X to Division B. This is the marginal cost of manufacture plus the opportunity cost of not being able to sell the component in the external market.

This is Rs. 8,000 + Rs.(16,000 – 8,000 – 1,000) = Rs. 15,000.

50 The correct answer is: Neither statement 1 nor statement 2

Not-for-profit organisations do have financial objectives, which may sometimes be described as financial constraints. For example, a charity organisation may want to maximise its funding and a government department may seek to carry out its activities within the spending budget for the department.

The outputs produced by commercial organisations can be measured simply by profit, which is a measure of the value created by the organisation in a period. Outputs of not-for-profit organisations cannot be measured as easily because they often have many different objectives, each measured in different ways.

51 The correct answer is: Profit before interest and tax

Gross profit ignores other expenses other than cost of sales. Profit before tax and profit after tax are after deducting items that do not relate to divisional performance (costs of interest on company debt and tax charges). Profit before interest and tax is the most appropriate measure of the four, and it will often be the same as operating profit.

52 The correct answers are:

- Percentage of repeat customers
- Number of warranty claims

Profitability index is a method of ranking investment opportunities where there is an investment capital constraint.

53 The correct answer is: Average waiting time at the hospital

Adherence to appointment times means starting an appointment at the scheduled time. One suitable measure might be the percentage of appointments that begin later than a certain amount of time, say 15 minutes. Of the performance measurements in the question, average waiting time on the appointment date would be the most appropriate.

54 The correct answer is: Number of patients treated per Rs. 1,000 spent on the state hospital service

Number of patients treated per Rs. 1million spent relates outputs to inputs, and is a measure of efficiency. Reducing a departmental budget is a measure of economy. A crime clear-up rate and an examination pass rate are measures of effectiveness for the police force and the state-owned college, respectively.

55 The correct answer is: The lower of the net marginal revenue for the transferring-in division and the external purchase price in the market for the intermediate product

For example, if the marginal cost of a transferred item is Rs. 500 and it has an external intermediate market of Rs. 700 but external selling costs of Rs. 50; and if the transferring-in division can use the transferred item to make an end product that earns a contribution of Rs. 1,000, the maximum transfer price should be the lower of Rs. 700 and Rs. 1000. The minimum transfer price should be Rs. 500 + Rs.(700 – 500 – 50) = Rs. 650.

56 The correct answer is: Internal business

The target is to improve the efficiency of dealing with customer calls. This may affect customer satisfaction and profitability, but its prime objective is to reduce call times and improve efficiency in the call centre.

57 The correct answer is: Percentage of customers making repeat orders

Making repeat orders is possibly a measure of customer satisfaction, and so might be used as a measure of performance from a customer perspective in a balanced scorecard. The growth in the product range is more relevant to innovation, and speed of order processing and orders per sales representative are measures of operational efficiency and effectiveness, rather than customer attitudes to the organisation and its products.

58 The correct answer is: Neither statement 1 nor statement 2

Providing value for money (VFM) means providing a service that is economical, efficient and effective. 'Economical' means getting the best price, but this does not necessarily mean 'cheap'. Measuring the percentage of collected refuse that is recycled is a measure of effectiveness, if recycling refuse is an objective of the service. ('Efficiency' measures an amount of output or benefit per unit of resource input.)

59 The correct answer is: Statement 2 only

When divisional performance is measured by residual income, a fair comparison of divisional performances is not possible, because the divisional residual incomes are not related to the size and asset value of each division. For example, residual income of Rs. 50,000 when divisional assets are Rs. 10 million is not as impressive as residual income of Rs. 50,000 when divisional assets are only Rs. 100,000.

When a transfer price is based on cost, the size of the profit mark-up is a matter for negotiation, and one of the divisional managers (or even both of them) are likely to consider the agreed transfer price as 'unfair', favouring the other division.

60 The correct answer is: Speed

Time between order and despatch is a measure of speed, which is an aspect of efficiency.

61 The correct answer is FDE: Rank in order of contribution per limiting factor.

Check limiting factor exists:

		Minutes required
Product D	3,000 × 20 mins	60,000
Product E	4,000 × 25 mins	100,000
Product F	5,000 × 15 mins	75,000
		235,000
Availability	2,500 × 60 mins	150,000
Shortage		85,000

	Product D	*Product E*	*Product F*
	Rs'000s	Rs'000s	Rs'000s
Selling price	32	28	22
Less variable costs	20	14	12
Contribution	12	14	10
Contribution per minute in Process A	12/20 = 0.6	14/25 = 0.56	10/15 = 0.67
Ranking	2	3	1

62 The correct answer is: DFE

	Product D Rs'000s	*Product E* Rs'000s	*Product F* Rs'000s
Selling price	32	28	22
Less materials costs	10	8	6
Throughput contribution	22	20	16
÷ time in Process A	22/20	20/25	16/15
	= 1.1	= 0.8	= 1.07
Ranking	1	3	2

63 The correct answer is: Capture organisational learning and document it to ensure lessons are learnt.

A post-completion audit is an objective, independent assessment of the success of a project in relation to plan. It covers the whole life of the project and provides feedback to managers to aid the implementation and control of future projects.

The audit is not intended as a means of directly appraising the performance of the project manager, or of obtaining sign-off on project documentation, or of closing budgetary codes.

64 The correct answer is: Ensuring the fitness for purpose of deliverables.

Quality is concerned with fitness for purpose. In a project management content the focus should ultimately be on ensuring the project deliverables are produced to
specification - which means to the required level of quality.

The aim should be to ensure quality during the project, rather than a reliance on the inspection and testing of output.

Lessons relevant to quality may be learned during the post-completion audit, but the main focus should be on ensuring the fitness for purpose of project deliverables.

In this context, the presentation of project reports is a relatively minor issue.

65 The correct answers are:

- Improved decision making
- Better researched projects
- Improved internal controls
- Highlight reasons for successful projects

A post-completion audit is an objective, independent assessment of the success of a project in relation to plan. It covers the whole life of the project and provides feedback to managers to aid the implementation and control of future projects.

Over time, by highlighting things that worked well and things that didn't, these audits will facilitate improved decision making, improved internal controls and better researched projects.

The process is not necessarily quick and inexpensive. The time and cost will depend to a large extent on the complexity of the project.

66 The correct answer is: Post-completion audit report

A cost-benefit review cannot be carried out until after the project has been completed and implemented operationally. This is a task for the post-completion audit. The purpose of a completion report is to document the completion of the project, with the client or project user signing off.

67 The correct answers are:

- Post-completion audits could produce valuable insights
- Post-completion audits will not prevent dysfunctional behaviour by project sponsors
- It may be difficult to introduce post-completion audits

It would not be reasonable or appropriate to find the project sponsor liable for all negative findings from post-completion audits. Project shortcomings should be investigated and those responsible held accountable, although in many situations a combination of factors and stakeholders contribute to the failing.

Judging the performance of production line managers based on the volume of production would encourage managers to push lines to the limit, sacrificing quality for quantity.

A post-completion audit can be completed retrospectively. This would be worthwhile for some past projects at Z, to enable lessons to be learned.

68 The correct answer is: Internal business (operational) perspective.

The target is to improve the efficiency of dealing with customer calls. This may affect customer satisfaction and profitability, but its prime objective is to reduce call times and improve efficiency in the call centre.

69 The correct answer is: (i), (ii), (iv) and (v) only.

ABM includes cost reduction, product design decisions, operational control and performance evaluation.

Although there have been a great many different definitions of ABM, none have specifically included variance analysis.

ABM does include more than the activities mentioned above, however.

70 The correct answer is: Neither statement 1 nor statement 2 is correct.

There is likely to be a demotivating effect where an ideal standard of performance is set, because adverse efficiency variances will always be reported. It is important that adverse variances are not used to lay blame if targets have been set with the aim of motivation.

A low standard of efficiency is also demotivating, because there is no sense of achievement in attaining the required standards. Managers and employees will often outperform the standard or target when in fact they could have performed even better if they had been sufficiently motivated.

SECTION 2 : 10 MARK QUESTIONS

71 JYT

Target costing

Target costing is a costing system that can be used when a company (such as JYT) is **unable to dictate a selling price** and is forced to accept the prevailing market selling price for a product.

After the specification of the product is completed, JYT will determine the price that the market is **prepared to pay** for the product (this may be by considering similar products already available or by carrying out market research). JYT then would subtract a target profit from the selling price to determine its **cost target**. If the expected cost of the product already meets the target cost over its lifecycle, including any expected cost reductions, then production can commence. If the expected cost exceeds the target cost then major changes are introduced to reduce costs so that the target cost is achieved. If JYT cannot achieve the target cost then the product will be abandoned.

Kaizen costing

Kaizen costing has been used by some Japanese firms for over twenty years and is now widely used in the electronics and automobile industries. 'Kaizen' translates as **continuous improvement**.

Functional analysis is applied at the design stage of a new product, and a **target cost for each function** is set. The functional target costs are added together and the total becomes the **product target cost**. Once the product has been in production for a year, the actual cost of the first year becomes the starting point **for further cost reduction**. It is this **process of continuous improvement, encouraging constant reductions by tightening the 'standards'**, that is known as kaizen costing.

JYT could apply Kaizen costing as follows. The previous year's actual production cost serves as the cost base for the current year's production cost. A reduction rate and reduction amount are set. **Actual performance** is **compared** to the **Kaizen goals** throughout the year and **variances are monitored**. At the end of the current year, the current actual cost becomes the cost base for the next year. New (lower) Kaizen goals are set and the whole process starts again.

Differences

One of the main differences between the two methods is that target costing is applied **before** production commences, but Kaizen costing is applied **after** production has started.

Another difference is that target costing requires significant changes to be made, but Kaizen costing involves making a number of small improvements to the whole process as part of continuous improvement.

72 HT Consumer Goods

(1) **Costs of quality conformance**

The cost of conformance is a discretionary cost which is incurred with the intention of **eliminating the costs of internal failure and external failure**. Costs of conformance may also be incurred as a result of achieving specified quality standards.

Costs of quality non-conformance

The cost of non-conformance, on the other hand, is the **cost of failure to deliver the required standard of quality**. Costs may be incurred as a result of supplying an item of insufficient quality to the customer (**external failure cost**) or due to a product needing to be re-worked (**internal failure cost**). The cost of non-conformance can only **be reduced by increasing the cost of conformance**.

(2) **The relationship between quality conformance costs and product selling prices in HT**

The market in which HT operates is highly competitive and **consumers focus on price and quality** when buying products. As a result, there is likely to be a trade-off between price and quality.

HT should consider undertaking **market research** to understand the extent to which customers are willing to **pay for quality**.

The more HT invests in developing quality products, the higher its costs will be. As a result, the selling price of products will need to be higher to cover the development costs and ensure that HT is profitable.

HT will need to decide whether to follow a **high price, high quality strategy** or something closer to a **low price, low quality strategy**. As the market leader with 15% market share, the strategy that HT adopts is likely to be followed by some of its competitors.

(3) **The definition of Kaizen**

Kaizen principles are built around the theory of **gradual, continuous improvement** and focus on obtaining small **incremental cost reductions** during the production phase of the product life cycle.

How HT can use Kaizen to extend the life of its products

The **life cycle** of products in the market in which HT operates is **extremely short**. **Extending** the life of these products would make HT **more profitable**.

Kaizen principles could achieve this by tightening internal quality standards to improve the overall quality of finished products. Tightening internal quality standards is also likely to result in small reductions in production costs which will improve HT profit margins.

73 Jola Publishing Co

(1) **Overall effect**

The change in overheads following re-allocation is not particularly significant overall. CB has only absorbed Rs. 0.50 more overhead which is 2% (0.50/23.00 × 100) and the overheads for TJ have fallen by 8% (3/39.50 × 100).

Property costs

The **largest overhead** is property costs which comprise 75% of total overhead. The activity driver for property costs is **machine hours** and this is also the basis used for absorption costing. This explains why the overall overhead change is not significant.

Quality control

Quality control comprises 23% of total overhead so is important. The activity driver for quality control is **number of inspections** and this will have a significant effect on the way overheads are allocated using ABC.

CB takes **fewer machine hours** to produce than TJ as it is a shorter book. It does however go through **frequent quality checks** so under ABC, will incur **much more** of the quality control overhead than TJ which has only a small number of inspections.

Production set-up costs

Production set-up costs comprise only 2% of total overhead so a change in overhead allocation will **not have a significant effect**.

However, the treatment of the overheads will be **very different** under ABC. CB is produced in four long production runs, whereas TJ is produced monthly in 12 production runs. Each production run incurs a set-up cost so TJ will incur a much higher proportion of these costs than if traditional absorption costing is used.

(2) **Implementation problems**

Lack of data

ABC requires **detailed accounting records** which may not be available in the business. Information is required on cost pools and cost drivers. This information is usually time consuming to derive and there may be resistance from employees.

Identifying cost drivers

It can be very difficult to identify a **single cost driver** which explains the behaviour of all items in its associated pool. For example, the property costs for this company could be driven by a number of different activities.

Lack of understanding

ABC is a **complex, time consuming technique** which will not necessarily be sufficiently understood and accepted by managers to enable them to provide **meaningful product costs** or extra information.

There can be an incorrect belief that ABC can solve all an organisation's problems but **costs of implementation** may **exceed the benefits**.

74 LMN

(1) The divisional directors are not happy with the present performance report and how it is being used to appraise their performance. LMN should consider **involving the directors** at the design stage of the new performance report.

As well as generating a number of ideas, directors are likely to **buy-in** to the new performance statement if they feel that they are being appraised fairly. This is likely to increase divisional performance.

Currently, inter-divisional trading occurs between divisions with transfer prices being set by Head Office. To continue to ensure that divisions trade with each other and in the best interests of the company, Head Office should ensure that there is **transparency** regarding how the transfer prices are calculated. This will ensure that no division is being favoured over another. The new divisional performance statement should also show the **impact of transfer prices on profitability**.

Currently, Head Office **costs are allocated** to divisions based on four bases including value of shares and capital invested and value of sales. Divisional managers could argue that these bases are unfair and do not allocate costs based on the true trading performance of the business but on an arbitrary basis over which the managers have no control.

LMN may wish to consider introducing **Activity Based Costing** as part of the new divisional performance report to ensure that costs are allocated to divisions based on transactions rather than volume.

Each of the above factors mean that the divisional directors are not in full control of their own results and it therefore seems unfair to measure their performance in this way.

(2) Introducing Activity Based Costing (ABC) at Head Office will provide LMN with a **more meaningful analysis of costs**. This should provide a suitable basis for the directors of each division and the Managing Director to make decisions about pricing, product mix, design and production.

ABC recognises the complexity of modern businesses through multiple cost drivers. Identifying **cost drivers** will ensure that costs are allocated from Head Office to LMN divisions fairly and truly reflect the trading performance of each division. LMN could replace its current bases with cost drivers such as number of production runs, number of inspections, number of purchase orders delivered and number of customer orders delivered.

ABC may also assist LMN in cost reduction because it could provide Head Office with an insight into the casual activities of the business. Consequently, the Managing Director may consider **outsourcing particular activities** within the business or even moving to different areas within **the industry value chain**.

Under the current system, it may be difficult to **contro**l the costs that are allocated to each division from Head Office. An ABC system will provide an insight into the way in which costs are structured and incurred at LMN Head Office. With ABC these costs can be controlled by **effectively managing the activities** which underlie them using a number of key performance measures.

75 Wargrin

(1) **Lifecycle costing**

Lifecycle costing tracks and accumulates costs and revenues attributable to each product over the **entire product life cycle**. A product's life cycle costs are incurred from its design stage through development to market launch, production and sales, and finally to its eventual withdrawal from the market.

Lifecycle costing is particularly suited to businesses such as Wargrin who manufacture products with short lifecycles and who have significant research and development costs. In order to compete effectively in today's competitive market, organisations need to **redesign continually their products** with the result that **product life cycles** have become much **shorter**. The **planning, design and development stages of a product's cycle** are therefore **critical** to an organisation's cost management process. Cost reduction at this stage of a product's life cycle, rather than during the production process, is one of the most important ways of reducing product cost.

(2) **Budgeted results**

	Year 1	*Year 2*	*Year 3*	*Total*
	Rs'000	Rs'000	Rs'000	Rs'000
Sales revenue	240,000	480,000	120,000	840,000)
Variable cost (W)	(40,000)	(80,000)	(20,000)	(140,000)
Fixed cost (W)	(80,000)	(120,000)	(80,000)	(280,000)
Marketing cost	(60,000)	(40,000)		(100,000)
Profit	60,000	240,000	20,000	320,000

Working

	Units	*Cost*
		Rs'000
Highest activity level	14,000	150,000
Lowest activity level	10,000	130,000
	4,000	20,000

Variable cost per unit = Rs. 20,000,000/4,000 units = Rs. 5,000

Fixed cost = total cost – variable cost

= 150,000,000 – (14,000 × Rs. 5,000)

= Rs. 80,000,000

If volumes exceed 15,000 units, fixed costs = Rs. 80,000,000 × 1.5 = Rs. 120,000,000

Assessment

The Stealth will make a **profit** in each of the three years with the highest profit in Year 2. In total, the **net profit margin** is 38% (320 million/840 million × 100%) which is above the target 35%.

The **contribution rate** is 83% (30 – 5/30 × 100%) which is also above the expected 75%. This indicates that the production process is expected to be under control and reliable.

Wargrin may therefore be satisfied that using **traditional** performance measures, the Stealth will be successful. However, this fails to take into account the **design and development costs** of Rs. 300 million. If this is incorporated into the profit forecast, the profit is then only Rs. 20 million. This may still be acceptable but it does illustrate the importance of looking at costs throughout the **entire lifecycle**.

76 The Gadget Co

(1) **Cost per unit per customer using activity based costing**

ABC recovery rates for each cost pool

Cost pool	*Cost* (Rs'000)	*Cost driver*	*Number of drivers*	*ABC recovery rate*
Machine set up costs	26,550	Production runs	36 (16 + 12 + 8)	Rs. 737,500 per set up
Machine running costs	66,400	Machine hours	32,100 (7,500 + 8,400 +16,200)	Rs. 2,070 per hour
Procurement costs	48,000	Purchase orders	94 (24 + 28 + 42)	Rs. 510,640 per order
Delivery costs	54,320	Deliveries	140 (48 + 30 + 62)	Rs. 388,000 per delivery
	195,270			

Total overheads by customer and per unit

	Customer A		*Customer B*		*Customer C*	
Overhead	*Activity*	*Cost*	*Activity*	*Cost*	*Activity*	*Cost*
		Rs'000		Rs'000		Rs'000
Machine set-ups	16	11,800	12	8,850	8	5,900
Machine running	7,500	15,525	8,400	17,388	16,200	33,534
Procurement	24	12,255	28	14,298	42	21,447
Delivery	48	18,624	30	11,640	62	24,056
Total overhead cost		58,204		52,176		84,937
Units produced		15,000		12,000		18,000
Overhead cost per unit		3.88		4.35		4.72

Total cost per unit by customer

	A	*B*	*C*
	Rs'000	Rs'000	Rs'000
Materials	2.40	3.60	4.80
Labour	1.48	2.22	2.96
Overheads	3.88	4.35	4.72
	7.76	10.17	12.48

(2) **How activity based costing can improve customer profitability**

Customer A

The cost per unit for customer A under an ABC system is Rs. 7,760. This is 16% higher than the costs under traditional absorption costing (Rs. 6,710) and is significant given that The Gadget Co sells to customer A for Rs. 7,500 per unit.

Customer A therefore makes a loss under ABC. Management may consider increasing the selling price to customer A as well as investigating ways to reduce the costs associated with that customer. Machine product costs for customer A are higher than for the other customers due to the number of production runs. Management should investigate whether it is possible to reduce the number of production runs associated with this customer.

Customer B

The cost per unit for customer B is Rs. 100 higher under ABC. This difference is minimal and the customer yields a healthy profit under both methods, given its selling price of Rs. 12,000.

Customer C

Customer C appears to be loss making under the traditional costing system with costs totalling Rs. 13,420 in comparison to the selling price of Rs. 13,000, yielding a loss of Rs. 420 per unit for this customer. In contrast, the customer is profitable under ABC with costs totalling Rs. 12,480 per unit. Management may therefore wish to consider putting more emphasis on to sales to customer C rather than the less profitable Customer A.

77 New product

(1) **Revised turn-out performance report**

	Flexed Budget	*Actual*	*Variance*
Output (batches)	50	50	
Direct labour hours	68.91 (W2)	93.65	24.74 (Adverse)
Direct labour cost (Rs.) (W3)	8,269.20	11,460.00	3,190.80 (Adverse)
Direct labour efficiency (Rs.) (W4)			2,968.80 (Adverse)
Direct labour rate (Rs.)			222.00 (Adverse)

Workings

The question states that the learning should have ceased after 30 batches.

1 **Average time for 30 batches (using learning curve data)**

$Y = ax^b$

$Y = 10 \times 30^{-0.5146} = 1.737$ hours

Total time for 30 batches = 30×1.737 hours = 52.11 hours

2 **Average time for 29 batches (using learning curve data)**

$Y = ax^b$

$Y = 10 \times 29^{-0.5146} = 1.768$ hours

Total time for 29 batches = 29 × 1.768 hours = 51.27 hours

Therefore, time for the 30th batch = 52.11 hours –51.27 hours = 0.84 hours

Total time for 50 batches = 52.11 hours + (20 batches × 0.84 hours) = 68.91 hours

3 **Total labour cost variance**

	Rs
Actual hours paid should cost (68.91 hours × Rs. 120 standard rate)	8,269.20
Actual hours paid did cost	11,460.00
Total variance	3,190.80 (A)

4 **Flexed budget direct labour efficiency variance**

	Hours
Actual production should use	68.91
Actual production did use	93.65
Difference	24.74 (A)
Valued at Rs. 120 standard cost per hour	2,968.80 (A)

(2) The above performance report is more useful to the production manager than the original report for a number of reasons.

The **assumptions concerning the learning curve** in the original budget are inaccurate.

The comparison in the original report is inaccurate as actual output is less than budget and no adjustment has been made to account for this (to expected direct labour hours or direct labour cost).

The revised report compares actual performance for 50 batches with expected costs based on the same level of output.

The **revised performance report analyses the direct labour cost variance** by slitting it into the labour efficiency variance and the labour rate variance. This will enable the production manager to see the proportion of the adverse variance that is due to resource utilisation and labour rates.

78 W Llc

(1) **The 'beyond budgeting' approach**

The beyond budgeting approach proposes that **traditional budgeting** as most organisations practise it should be **abandoned** in favour of an approach more suited to a **modern business environment** of rapid **technological change** and **market uncertainty**.

Traditional annual plans are often **not responsive** to current situations. Under the beyond budgeting approach managers should plan on **a rolling basis** with a focus on **cash forecasting** rather than purely on cost control.

Emphasis should also be placed on encouraging a culture of **personal responsibility** by delegating decision making and performance accountability to **line managers**.

(2) W Llc operates in a competitive fast changing industry with uncertain market conditions. Product innovation and a **fast response to industry developments** and relative industry benchmarks is very important for the survival of the company. Traditional budgeting and **long-term planning** may be of **limited value** as it may not be possible for W Llc to **predict** conditions a year in advance.

There are arguments for the 'beyond budgeting' approach which gives local managers the power to make decisions in response to market conditions and customer demand. Performance would be measured against **relative improvements** and **value added**.

It may be necessary to maintain a form of **short term budgeting** provided this is implemented with a degree of **flexibility** in full knowledge and understanding of the dynamic market conditions.

(3) Standard costing and variance analysis **concentrate on only a narrow range of costs** such as quality and customer satisfaction.

Standard costing systems were developed when the business environment was more stable and less prone to change. The **current business environment** is more **dynamic** and it is not possible to **assume stable conditions**.

Standard costing systems assume that **performance to standard is acceptable**. Today's business environment is more focused on **continuous improvement**.

79 DVD and Bluray

This is a particularly difficult variance question because you must account for the revised market details. Do not be disheartened if you get this incorrect.

(1) (i) **Sales mix profit margin variance**

	Actual sales	*Revised standard mix **	*Difference*	*Profit per unit*	*Variance* (Rs'000)
DVD	3,000	2,800	+200	Rs. 25,000	5,000 (F)
Blu-ray	1,200	1,400	–200	Rs. 95,000	19,000 (A)
	4,200	4,200			14,000 (A)

* The revised standard mix

The revised standard mix is based on the revised budget of 1,500 units of Blu-ray players while DVD sales are unaffected (3,000 units).

DVD = (3,000/4,500) × 4,200 = 2,800
Blu-ray = (1,500/4,500) × 4,200 = 1,400

(ii) **Sales volume profit variance**

The sales volume profit variance only relates to Blu-ray players as the actual and budgeted sales of DVD players are the same.

The variance is (1,500 – 1,200) × Rs. 95,000 = Rs. 28.5 million (A)

(2) The sales manager is not responsible for the increase in market size as this was caused by external factors. Therefore the variances relating to changes in market size should be regarded as **planning variances**. The sales manager is responsible for the change in selling price and so any variances attributed to this change should be treated as **operating variances**.

The market size variance compares the original and revised market size. For DVD players the market size is unchanged so there is no variance. For Blu-ray players the variance is:

(1,500 – 1,000) × Rs. 95,000 = Rs. 47,500,000 (F)

This figure is important as it shows the measurement of performance by the sales manager is distorted if the effect of the change in market size is not taken into account. The favourable variance of Rs. 19 million which the sales manager has referred to in his/her email is made up of two parts; the **market size variance** and the **sales volume profit variance** which have both been calculated above.

The overall favourable variance is caused by the change in market size which is a planning variance and outside the control of the manager. Therefore the manager is not responsible for the favourable performance and should not be awarded a bonus as a result.

80 Budgets for solicitors

(1) A feedback control system can be defined as the process of **reporting back control information to management** and the control of information itself. In a business, it is **information produced from within the organisation** (management control reports) with the purpose of helping management and other employees with control decisions.

In a firm of solicitors, a partner may explain that the reason for actual fee income being significantly above budget is due to the win of a new client. As a result of this feedback, the central budget may be updated to take account of the increased fee income going forward.

A feed forward control system is a system which **aims to forecast differences between actual and planned outcomes** and implement action, before the event, to avoid such differences.

An example would be the comparison of the original cash budget (taking the overdraft facility into account) with the target cash balance. Planned expenditure may have to be postponed in order to ensure that the solicitors meet cash targets and stay within the limits of the overdraft facility. In such instance, a second draft of the cash budget will be prepared.

(2) A potentially beneficial consequence of involving the firm's other partners in the budget setting process is **greater transparency** which will help to further partners knowledge of the budgeting system. Each partner will understand exactly which targets they are responsible for and how performance in each area will be measured.

Partners will also understand how **elements of the budget are interdependent**. For example, if actual fee income is significantly below budget, it is unlikely that cash targets will be met.

A potentially adverse consequence of involving the other partners in the budget setting process is that **poor attitudes** or **hostile behaviour** may be shown towards the budgetary control system.

Partners may feel pressured by the draft budget and may complain that it is **not realistic**. They may attempt to **build slack into the budget** to ensure that **targets are more easily achievable** than if the budget was set solely by the managing partner. This could lead to the firm becoming less efficient in the long-term.

81 PQ

PQ operates a market skimming pricing strategy. This involves charging high prices when a product is first launched and spending heavily on advertising and sales promotion to obtain sales.

(1) **Selling price changes**

As the product moves into the later stages of its life cycle, **progressively lower prices will be charged**.

PQ may first reduce sales prices at the **growth** stage in a bid to prevent competitors from entering the market. Reducing the price at this stage is likely to increase demand.

Sales prices are likely to decrease significantly at the **maturity** stage. Competitors will have flooded the market with alternative products and PQ is likely to lower sales prices as a means of sustaining demand for its products.

At the **saturation and decline** stage, the market will have bought enough of PQ's products and demand will start to fall. Due to the competitive market in which the company operates, products may become obsolete. For a while, PQ products will still be profitable in spite of declining sales but eventually products will become loss-making and the company may decide to stop selling the product.

PQ may attempt to prolong the life of its products by reducing selling prices significantly at this stage.

(2) **Production cost changes**

To an extent, production costs will change in line with unit sales over the course of the product life cycle.

Production costs per unit are likely to be highest at the **growth stage** as demand for PQ products increases and sales increase. PQ products should begin to make a profit at this stage as the initial costs of investment in new products are gradually recovered. Production costs per unit could be reduced through economies of scale.

At the **maturity** stage, the growth in demand for products will slow down. PQ may choose to modify or improve products as a means of preserving demand. Such a strategy is likely to lead to an increase in production costs.

As outlined above, demand for PQ products will decrease at the **saturation and decline** stage. In line with the reduced demand, fewer products are likely to be produced which will lead to a reduction in production costs. This could be offset by an increase in costs due to machine breakdowns and inefficiencies.

(3) **Selling and marketing cost changes**

Sales and marketing costs likely to remain high at the **growth** stage as PQ aims to justify high selling prices by distinguishing itself from the competition and attempting to make it difficult for other companies to enter the consumer electronics market.

Sales and marketing costs are likely to decrease at the **maturity** stage as the product is established in the market and therefore does not require extensive advertising and marketing campaigns.

As with production costs, sales and marketing costs can be expected to decrease significantly at the **saturation and decline** stage as the product is nearing the end of its life.

82 X Group

JIT definition

JIT is a customer-led production system, also known as a 'pull' system. The objective is to produce products as they are required by the customer rather than build up inventory to cater for demand.

Just-in-time production

A JIT production system is driven by demand for finished products whereby each component in a process is only made when needed for the next stage.

Just-in-time purchasing

A JIT purchasing system requires material to be purchased so that as far as possible it can be used straightaway.

The effect on X Group's profitability

The introduction of a JIT production and purchasing system could have the following impacts:

(i) **Increased efficiency** – One of the key principles in JIT production is the elimination of waste (for example through the elimination of defects, and the reduction of idle time). Reducing waste – and, correspondingly, increasing the efficiency of its production processes – should help X to increase its profitability.

Similarly, if throughput time is reduced, and X can satisfy customer demand more quickly, this could help it to increase revenue – particularly during periods of high demand.

(ii) **Customer satisfaction** – Reducing the level of defects should also help to increase customer satisfaction levels. If X is able to increase its levels of customer retention (as a result of these increased satisfaction levels) this should also boost revenue and profitability.

(iii) **Supplier relationships** – X Group currently uses a large number of suppliers. However, the increased importance of on-time deliveries and supplier reliability required to implement JIT successfully means it is likely that X will need to reduce the number of suppliers it works with, and develop stronger relationships with the ones it retains. On the one hand, this could increase the bargaining power of the suppliers, and if they increase their prices accordingly this could reduce X's profitability. On the other hand, dealing with a smaller number of suppliers could enable X to benefit from greater economies of scale in purchasing which could help it to increase its profitability.

(iv) **Quality control costs** – Particularly in the short term, as it adjusts to the new system, X may need to incur additional quality control costs to monitor the quality of materials received from suppliers and the finished goods it produces for customers. However, in the longer term, these costs should be outweighed by the benefits X experiences by continuously improving quality and reducing the level of defects.

(v) **Potential impact of disruption** – The absence of any inventories means that X could become vulnerable to any disruptions in its supply chain. For example, if one of its suppliers fails to deliver component parts when they are due, this could force production to stop at very short notice, and is also likely to mean that X is unable to fulfil customer orders. In turn, this could lead to a fall in revenues and profits.

(vi) **Inventory holdings costs** – Introducing JIT should mean that X enjoys a significant reduction in its inventory holding costs, because it will no longer be holding two weeks' safety inventory. However, while a reduction in inventory levels will help X's working capital management, this will not, in itself, have any impact on profitability (unless X currently has to write off substantial amounts of slow-moving or obsolete inventory).

83 HJ

(1) **Standard costs**

The standard cost approach is to **develop a product**, determine the **expected standard production cost** of that product and then set a selling price (probably based on cost). Costs must be kept within the standard cost limit and variances are calculated to check that this has happened.

Target costs

The target cost approach is to develop a product concept and then determine the **price that customers would be willing to pay** for the product. The desired profit margin is deducted from the price, leaving a figure that represents total cost. This is the target cost and the product **must be capable of being produced for this amount** otherwise the product will not

be manufactured. Because target costing places emphasis on continual cost reduction and focuses on profit margins, it is a useful tool that can help to strengthen an organisation's competitive position.

How HJ can derive target costs from target prices

HJ should start by examining prices charged by competitors for the new range of promotional gifts or carry out **market research to establish the price that customers are willing to pay** for key fobs, card holders and similar items. HJ should then decide on the profit that it requires from the new product range in order to deliver sufficient return on its investment in new machinery. HJ should **subtract the profit from the selling price** to derive the **target cost** for the plastic moulded products. HJ will then need to review its production methods to ensure that the new range of products can be produced for the calculated target cost.

(2) Marginal cost pricing is the method of determining the sales price for a product by **adding a profit margin** on to either the marginal cost of production or the marginal cost of sales. The marginal-cost model is often used to **break into new markets** that are well established but is unlikely to be financially viable in the long term as businesses need to recover fixed costs and deliver a return on investment.

If HJ make price decisions based on the need for full recovery of all costs sales prices are likely to be higher than if a marginal cost approach was used, assuming a similar mark-up is applied. It is therefore important that HJ is seen to **add value to the product range in order to justify the higher selling price**.

HJ could add value by designing products from the new gift range in the same style as the cards and calendars that are part of the original product range that the company specialises in. For example, key fobs and card holders could be designed in the same colours as the calendars, thus encouraging customers to purchase the full range of matching products.

84 Cement Co

(1) **Pay-off table**

			SUPPLY (number of bags)		
		Probability	*350,000*	*280,000*	*200,000*
	Weather	*	Rs million	Rs million	Rs million
DEMAND	Good Rs'000	0.25	1,750 (W1)	1,400	1,000
	Average Rs'000	0.45	1,085 (W2)	1,400	1,000
	Poor Rs'000	0.30	325	640	1,000

* Probability column is shown to assist in calculations to part (2) (iii).

Profit per bag sold in coming year = Rs. 9,000 – Rs. 4,000 = Rs. 5,000

Loss per bag disposed of = Rs. 4,000 + Rs. 500 = Rs. 4,500

Workings

1 350,000 × Rs. 5,000 = Rs. 1,750 million

2 (280,000 × Rs. 5,000) – (70,000 × Rs. 4,500) = Rs. 1,085 million etc

(2) (i) **Maximin**

Select the least unattractive worst outcome (the option that maximises the minimum profits).

	SUPPLY (number of bags)		
	350,000	*280,000*	*200,000*
	Rs million	Rs million	Rs million
Worst	325	640	1,000

The highest of these is Rs. 1,000 million therefore choose to supply only 200,000 bags to meet poor conditions.

(ii) **Maximax**

Select the best possible outcome (the option that maximises the maximum profit).

	SUPPLY (number of bags)		
	350,000	*280,000*	*200,000*
	Rs million	Rs million	Rs million
Best	1,750	1,400	1,000

The highest of these is Rs. 1,750 million, therefore choose to supply 350,000 bags to meet good conditions.

(iii) **Expected value**

Use the probabilities shown in part (1) to calculate the expected value of each of the supply levels.

Good (0.25 × Rs. 1,750 Rs million) + (0.45 × Rs. 1,085 million) + (0.30 × Rs. 325 million) = Rs. 1,023,250,000

Average (0.7 × Rs. 1,400 million) + (0.3 × Rs. 640 million) = Rs. 1,172 million

Poor 1 × Rs. 1,000 million = Rs. 1,000 million

The expected value of producing 280,000 bags when conditions are average is the highest at Rs. 1,172 million therefore this supply level should be chosen.

85 HT

Contribution earned by each product

	HT01	*HT02*	*HT03*
	Rs.	Rs.	Rs.
Price	150.0	200	220.0
Variable production costs (see part (a))	132.5	181	198.4
	17.5	19	21.6

Define variables

Let a, b, c be the number of HT01, HT02 and HT03 produced respectively.

Establish objective function

The objective function is to maximise contribution C, given by:

$C = 17.5a + 19b + 21.6c$

Establish constraints

The constraints are as follows.

$25a + 30b + 33c \leq 257{,}600$ (labour hours)
$a + 2b + 2c \leq 20{,}000$ (materials)
$a \leq 16{,}000$ (demand for HT01)
$b \leq 10{,}000$ (demand for HT02)
$c \leq 6{,}000$ (demand for HT03)
$a, b, c \geq 0$

Introduce slack variables

Let S_1 be the number of unused labour hours.
Let S_2 be the number of unused kilograms of material.
Let S_3, S_4, S_5 respectively be the number of units produced of HT01, HT02 and HT03 less than the maximum demand.

Reformulate constraints

$25a + 30b + 33c + S_1 = 257{,}600$
$a + 2b + 2c + S_2 = 20{,}000$
$a + S_3 = 16{,}000$
$b + S_4 = 10{,}000$
$c + S_5 = 6{,}000$
$a, b, c \geq 0$

Reformulate objective function

The objective function is to maximise C, given by:

$C - 17.5a - 19b - 21.6c + 0S_1 + 0S_2 + 0S_3 + 0S_4 + 0S_5 = 0$

86 HT 123

In the final tableau the **variables** represented in the **solution column** are respectively S_5, HT01, S_3, S_4, S_2. The **optimal solution** is therefore to produce 10,304 units of HT01, with no production of HT02 or HT03. The contribution arising from this policy is given in the solution row as Rs. 180,320,000 (check: 10,304 × Rs. 17,500 = Rs. 180,320).

The **remaining figures in the solution column** indicate the following.

S_5 = 6,000 (production of HT03 should be 6,000 less than demand, ie nil)

S_3 = 5,696 (production of HT01 should be 5,696 less than demand ie 10,304 (16,000 – 5,696) as indicated above)

S_4 = 10,000 (production of HT02 should be 10,000 less than demand, ie nil)

S_2 = 9,696 (there will be 9,696 kilograms of unused material (check: 20,000 – (10,304 × 1) = 9,696)

Since there is **no value for S_1,** it follows that **labour hours will be fully utilised** (check: 10,304 × 25 = 257,600).

The **shadow prices of HT02 and HT03** are Rs. 2000 and Rs. 1500 respectively. This means that for every unit of HT02 or HT03 made, contribution would fall by Rs. 2000 and Rs. 1,500 respectively. In other words, the contribution from HT02 and HT03 would need to rise by at least those respective amounts before it became profitable to manufacture them at the expense of HT01.

Adoption of the **optimum production plan** will lead to the following **results**.

	Rs '000
Contribution earned	180,320
Less: fixed overheads	184,000
Net loss for year	3,680

The **shadow price of one hour of labour (S_1)** is Rs. 700. This means that for every extra hour of labour made available at its normal cost of Rs. 4 per hour, contribution could be increased by Rs. 700 (Check: one hour of labour would produce 1/25th of a unit of HT01 at a contribution of Rs. 17,500/25 = Rs. 700.) This interpretation is only valid while labour hours are a constraint on production.

87 PP

(1) Net present value before new business cash flows

Year	0	1-4
	Rs million	Rs Million
Initial investment	(600)	
Maintenance		(50)
Redundancy costs	(200)	
Annual cost saving		100
Net cash flow	(800)	50
Discount factor at 12%	1.000	3.037
Present value	(800)	151.9
NPV	(648.1)	

(2) To achieve a zero NPV, the project will need cash flows with a present value of Rs. 648,100,000. If we assume that the cash inflows are spread evenly across the four year period we can use the four year annuity factor to calculate the annual cash flows required from the new business.

From part (1) we know the four year annuity factor at 12% is 3.037. Therefore the annual net cash inflow required is 648,100,000/3.037 = Rs. 213,401,000.

The net cash inflows are expected to be 52% of the cash inflows (revenue) from the new business. Therefore the annual cash inflow would be 213,401,00/0.52 = Rs. 410,387,000

This is the annual cash flow required in order for the project to achieve xero Net Present Value.

88 T LLC

Cost statement for T LLC

	Note	Rs.
Demonstration and complimentary lunch	1	Nil
Engineers	2	50,000
Technical advisor	3	48,000
Site inspector visits	4	Nil
Training costs	5	12,500
Telephone handsets	6	218,400
Computerised control system	7	760,000
Cable costs	8	130,000
Relevant cost		1,218,900

As the cost is below the offered price of Rs. 1,300,000, the contract should be accepted by T LLC,

(1) **Demonstration and complimentary lunch**

The salesman has already been to visit Push LLC to demonstrate the new system. The associated costs are sunk costs (they have already been incurred) and are therefore excluded from the cost statement.

Relevant cost = Rs. 0

(2) **Engineers**

One of the three engineers has spare capacity to complete the installation and his/her salary will be paid regardless of whether they work on the contract for Push Co. The relevant cost is therefore Rs. Nil.

The other two engineers are currently fully utilised and earn a contribution of Rs. 500 per hour each on Contract X. The engineers could be temporarily taken off of Contract X to work on the contract for Push LLC. Work on Contract X would recommence in one week's time when there is no other scheduled work for the engineers.

Delaying the work on Contract X would result in T LLC missing the contractual completion deadline and having to pay a one-off penalty of Rs. 50,000.

Relevant cost = Rs. 50,000

(3) **Technical advisor**

The technical advisor is working at full capacity so would need to work 8 hours overtime on the contract for Push LLC. All overtime is paid at a premium of 50% above his usual hourly rate of Rs. 4,000 (Rs. 4,000 × 1.5 = Rs. 6,000).

Relevant cost = Rs. 6,000 × 8 hours = Rs. 48,000

(4) **Site inspector visits**

The site inspector is an independent contractor who is not employed by T LLC and charges Push LLC directly for the work. Since the site engineer charges Push, the relevant cost for T LLC is nil.

Relevant cost = Rs. Nil

(5) **Training costs**

The system trainer is paid a monthly salary of Rs. 150,000. This is not a relevant cost, as it is not incremental. The trainer is also paid Rs. 12,500 commission for each day spent delivering training at a client's site. This cost will arise as a direct result of the decision and is therefore included.

Relevant cost = Rs. 12,500 per day × 1 day = Rs. 12,500

(6) **Handsets**

120 handsets would need to be supplied to Push LLC. Though 80 handsets are already in inventory, the handsets are frequently requested by T LLC's customers and so would need to be replaced if supplied to Push LLC. The current cost of a handset is Rs. 1,820.

Relevant cost = Rs. 1,820 × 120 handsets = Rs. 218,400

(7) **Computerised control system**

The current market price of Swipe 2 is Rs. 1,080,000.

The original cost of Swipe 1 (Rs. 540,000) is a sunk cost and not relevant to the decision.

The current market price of Swipe 1 (Rs. 545,000) is also not relevant to the decision as LLC Co has no intention of replacing Swipe 1.

The company could sell Swipe 1 for Rs. 300,000 if it does not use it for this contract. This represents an opportunity cost.

In addition to the Rs. 300,000, Swipe 1 could be modified at a cost of Rs. 460,000, bringing the total cost of converting Swipe 1 to Rs. 760,000.

The total cost of converting Swipe 1 (Rs. 760,000) is significantly less than purchasing Swipe 2 (Rs. 1,080,000). It is assumed that the company would choose the cheaper option.

Relevant cost = Rs. 760,000

(8) **Cable costs**

1,000 metres of cable is required. Although T LLC has 200 metres of cable in inventory, it is used frequently and so would need to be replaced. All 1,000 metres should be valued at the current market rate (Rs. 130 per metre). The original purchase cost of Rs. 120 per metre is a sunk cost and is not relevant to the decision.

Relevant cost = 1,000 metres × Rs. 130 per metre = Rs. 130,000

89 C Plc

(1) The senior management of C Plc has stated that the divisions should consider themselves to be independent businesses as far as possible. However, these are highly inter dependent and have **little control** over their business activities. The current policy is bound to have **behavioural implications** and ROI may be inappropriate in terms of the divisions' performance evaluation.

WD selling to PD

As WD sells about two thirds of its output to division PD, the profits of both divisions depend on the transfer price between them. As this is set on a cost plus basis assessing the division on ROI is likely to lead to dysfunctional behaviour and have behavioural implications.

PD buying all timber from WD and selling all output to TD

PD has little control over its business activities and ROI will lead to dysfunctional decision making.

(i) Short term decisions may be made at the expense of long term improvements, eg replacing machinery may worsen ROI in the short term.

(ii) No incentive to control or reduce costs

(iii) No incentive to improve efficiency

TD selling to outside market

The cost structure of TD is determined by internal transfers, leaving TD with no control over costs. TD may be restricted in sales growth if it cannot have a wider product range.

(2) The transfer prices more likely to minimise dysfunctional behaviour and sub-optimal decisions are market prices. Where market prices are not reliably available some theories advocate a transfer price as close to the market price as possible.

Transfer from PD to TD

PD has no control over the volume of its output and cannot buy or sell outside C plc. As such it cannot be a profit centre as it has no independence.

It would be more appropriate for PD to be considered as a **cost centre**. As such, there are theoretical arguments for transferring at marginal cost. This of course would be resulting in what appear to be losses for PD. In practice, a **standard cost** may be adopted based on full cost rather than marginal cost basis. The target would be for PD to **break even** as a cost centre. The implication for the receiving division TD is that it may be obtaining products at below market prices. This may be advantageous in that it could lead to higher demand as a result of lower final prices. However, a careful balance must be strictly applied to achieve **profit maximisation**.

90 Transfer pricing

(1) Transfer pricing is used when divisions of an organisation need to charge other divisions of the same organisations for goods and services they provide. The basic object of transfer pricing is that relevant divisions within an organisation are **evaluated effectively** and the transfer price does not **distort** divisional performance **evaluation**.

The level at which a transfer price should be set, however, is **not** a **straightforward** decision for organisations. The situation is even less clear cut for organisations operating in a number of countries, when even more factors need to be taken into consideration. Some of these factors and their impact on the transfer price are set out below. Moreover, the **manipulation** of **profits** through the use of transfer pricing is a common area of confrontation between multinational organisations and host country governments.

(i) **Exchange rate fluctuation**

The value of a transfer of goods between profit centres in different countries could depend on fluctuations in the currency exchange rate.

(ii) **Taxation in different countries**

If taxation on profits is 20% of profits in Country A and 50% of profits in Country B, a company will presumably try to '**manipulate**' **profits** (by means of raising or lowering transfer prices or by invoicing the subsidiary in the high-tax country for 'services' provided by the subsidiary in the low-tax country) so that profits are maximised for a subsidiary in Country A, by reducing profits for a subsidiary in Country B.

Artificial attempts at reducing tax liabilities could, however, upset a country's tax officials if they discover it and may lead to some form of penalty. Many tax authorities have the power to modify transfer prices in computing tariffs or taxes on profit, although a genuine **arms-length market price** should be accepted.

(iii) **Import tariffs/customs duties**

Suppose that Country A imposes an import tariff of 20% on the value of goods imported. A multi-national company has a subsidiary in Country A which imports goods from a subsidiary in Country B. In such a situation, the company would minimise costs by keeping the transfer price to a minimum value.

(iv) **Exchange controls**

If a country imposes restrictions on the transfer of profits from domestic subsidiaries to foreign multinationals, the restrictions on the transfer can be overcome if head office provides some goods or services to the subsidiary and charges **exorbitantly high prices**, **disguising the 'profits'** as sales revenue, and transferring them from one country to the other. The ethics of such an approach should, of course, be questioned.

(v) **Anti-dumping legislation**

Governments may take action to protect home industries by preventing companies from transferring goods cheaply into their countries. They may do this, for example, by insisting on the use of a fair market value for the transfer price.

Alternative suggestions

Competitive pressures

Transfer pricing can be used to enable profit centres to match or undercut local competitors.

Repatriation of funds

By inflating transfer prices for goods sold to subsidiaries in countries where inflation is high, the subsidiaries' profits are reduced and funds repatriated, thereby saving their value.

Minority shareholders

Transfer prices can be used to reduce the amount of profit paid to minority shareholders by artificially depressing a subsidiary's profit.

(2) A transfer price based on **marginal cost** is the **theoretically correct transfer price** to encourage total organisational profitability when there is **no external market** for the item being transferred and **no capacity constraints** affecting production (so that there is no opportunity cost associated with the transfer). If there is no external market for the product, marginal cost would be an appropriate transfer price provided that there is no relevant capacity constraints.

A transfer price at marginal cost means that **the supplying division does not cover its fixed costs,** however, and so makes **no contribution on the transfer**, and no profit. There is therefore **no incentive** for the division to make the transfer. **Head office** would therefore be likely to have to **insist** that the transfers were made, thereby **undermining divisional autonomy**.

There are a number of ways in which the **problem of not covering fixed costs can be overcome**, however, such as **dual pricing** and a **two-part tariff system**, although these may also **undermine divisional autonomy**.

91 RI and EVA

(1) **Residual income**

Residual income (RI) is a **measure** of the **centre's profits** after **deducting a notional or imputed interest cost**.

(i) The centre's profit is after deducting depreciation on capital equipment.

(ii) The imputed cost of capital might be the organisation's cost of borrowing or its weighted average cost of capital.

Unlike return on investment (ROI) which is a percentage or relative measure, RI is an absolute measure.

Economic value added

Economic value added (EVA)® is a specific type of residual income (RI) calculated as follows.

EVA® = net operating profit after tax (NOPAT) less capital charge

where the capital charge = weighted average cost of capital × net assets

You can see from the formula that the calculation of EVA is very similar to the calculation of RI. EVA and RI are similar because both result in an **absolute figure** which is calculated by subtracting an imputed interest charge from the profit earned by the investment centre. However, there are differences as follows.

Differences

(i) The **profit figures are calculated differently**. EVA is based on an 'economic profit' which is derived by making a series of adjustments to the accounting profit, such as adjusting historic accounting depreciation and adding back any 'investment expenditure' such as advertising or R&D.

(ii) The **notional capital charges use different bases** for net assets. The replacement cost of net assets is usually used in the calculation of EVA.

(2) (i) **The main features of Economic Value Added** (EVA®) as it would be used to assess the performance of divisions:

EVA like Residual Income (RI) is a **performance measure expressed in absolute terms**. It is based on the concept of net economic profit after tax less a deduction for an imputed interest charge.

The relationship between economic and accounting profit is explained below. The imputed interest charge is based on the company's weighted average cost of capital. The assets are at their replacement cost as explained below. The imputed interest charge is based on the company's weighted average cost of capital.

EVA = net operating economic profit after tax less capital charge where the capital charge = weighted average cost of capital × net assets

The weighted average cost of capital is based on the capital asset pricing model.

(ii) How the use of EVA to assess divisional performance might affect the behaviour of divisional senior executives:

- It is argued that maximisation of the EVA® target will lead to managers maximising wealth for shareholders.
- The adjustments within the calculation of EVA mean that the measure is based on figures closer to cash flows than accounting profits. Hence, EVA is less likely to be distorted by the accounting policies selected.
- EVA like RI is an absolute measure, as compared to a relative one such as ROCE. As such it will not lead to sub-optimal decisions with respect to new investment as it is the absolute increase in shareholder value which is used as a criterion.
- EVA is based on **economic profit** which is derived by making a series of adjustments to **accounting profits**.
- The assets used for the calculation of EVA are valued at their replacement cost and not at their historic accounting cost. They are also increased by any costs that have been capitalised as a result of the above adjustments.

92 Pasta division

(1)

	Before expansion	*Additions*	*After proposed expansion*
	Rs. m	Rs. m	Rs. m
Investment in non-current assets	1,500	+750	2,250
Investment in working capital	1,000	+350	1,350
Net divisional assets	2,500		3,600
Operating profit	500	+198	698
Return on investment	20.0%		19.4%

(2)

	Before expansion	Rs. m	*After proposed expansion*	Rs. m
Operating profit		500		698
Imputed interest on net divisional assets	(Rs. 2,500m × 15%)	375	(Rs. 3.6m × 15%)	540
Residual income		125		158

Using **return on investment (ROI)** as a performance measure, the divisional manager would not be happy to accept the proposed expansion. The ROI would reduce if the expansion went ahead, indicating a **deterioration** in the division's performance, and because bonuses are paid as a percentage on this basis, the manager would receive a lower bonus.

If **residual income (RI)** was used as a performance measure the manager would be happy to accept the proposed expansion. This is because the RI would increase as a result of the expansion. This indicates an **improvement in the division's performance** and so the manager would receive a higher bonus.

93 PKA

(1) **Objectives of working capital management**

The two main objectives of working capital management are to ensure it has **sufficient liquid resources** to continue in business and to **increase its profitability**.

Every business needs adequate **liquid resources** to maintain day-to-day cash flow. It needs enough to pay wages, salaries and accounts payable if it is to keep its workforce and ensure its supplies.

Maintaining adequate working capital is not just important in the short term. Adequate liquidity is needed to ensure the **survival** of the business in the long term. Even a profitable company may fail without adequate cash flow to meet its liabilities.

On the other hand, an excessively conservative approach to working capital management resulting in high levels of cash holdings will **harm profits** because the opportunity to make a return on the assets tied up as cash will have been missed.

These two objectives will often **conflict** as liquid assets give the lowest returns.

(2) **Cost of current ordering policy**

Minimum inventory level = re-order level – (average usage × average lead time)

Average usage per week = 625,000 units/50 weeks = 12,500 units

Average lead time = 2 weeks

Re-order level = 35,000 units

Minimum inventory level = 35,000 – (12,500 × 2) = 10,000 units

$$\text{Average inventory} = \text{Minimum level} + \frac{\text{reorder quantity}}{2}$$

= 10,000 + (100,000/2)
= 60,000 units

Annual holding cost = 60,000 × Rs. 500 = Rs. 30,000,000
Annual ordering cost = Rs. 250,000 × (625,000/100,000) = Rs. 1,563,000
Annual total cost = 30,000,000 + 1,563,000 = **Rs. 31,563,000**

Economic order quantity

$$EOQ = \sqrt{\frac{2C_0D}{C_h}} = \sqrt{\frac{2 \times 250 \times 625,000}{0.5}} = 25,000 \text{ units.}$$

Number of orders per year = 625,000/25,000 = 25
Annual ordering cost = Rs. 250,000 × 25 = Rs. 6,250,000
Annual holding cost = (10,000 + (25,000/2)) × Rs. 500 = Rs. 11,250,000
Annual total cost = 11,250,000 + 6,250,000 = **Rs. 17,500,000**
Saving as a result of using the economic order quantity model = 31,563,000 – 17,500,000 = **Rs. 14,063,000** per year

94 FLG

(1)

$$EOQ = \sqrt{\frac{2 \times \text{demand (units)} \times \text{ordering cost}}{\text{holding cost}}}$$

$$= \sqrt{\frac{2 \times 60,000 \times 6,000}{500}}$$

$$= \sqrt{1,440,000}$$

= 1,200 units

Number of orders per year = 60,000/1,200 = 50 orders

Annual ordering cost = 50 × Rs. 6,000 = Rs. 300,000

Average inventory held = 1,200/2 = 600 units

Annual holding cost = 600 × Rs. 500 = Rs. 300,000

Inventory cost = 60,000 × Rs. 12,000 = Rs. 720,000,000

Total cost of inventory using EOQ = 720,000,000 + 300,000 + 300,000 = **Rs. 720,600,000**

(2) Order size for bulk discounts is 10,000

Number of orders per year = 60,000/10,000 = 6

Annual ordering cost = 6 × Rs. 6,000 = Rs. 36,000

Average inventory = 10,000/2 = 5,000 units

Annual holding cost = 5,000 × Rs. 2,000 = Rs. 10,000,000

Inventory cost = 60,000 × Rs. 12,000 × 99% = Rs. 712,800,000

Total cost of inventory with discount = 712,800,000 + 36,000 + 10,000,000 = **Rs. 722,836,000**

Using the **EOQ approach** will result in a slightly lower inventory cost.

95 Government bonds

(1) Taking 7% and 9% as the rates.*

7%:	6 × 7,024	42,140
	100,000 × 0.508	50,800
		92,940
9%:	6 × 6,418	38,510
	100,000 × 0.422	42,200
		80,710

Extrapolating:

$$7\% + \frac{92,940 - 88,000}{92,940 - 80,710} \times 2 = 7\% + \frac{4,940}{12,230} \times 2 = 7.8\%$$

* You can choose different rates – you should still get the same answer. We would expect the yield to maturity to be slightly above the coupon rate.

(2) Using rates of 9% and 11% from the tables:

(1,000 × 0.708) + (120 × 3.240) = 1,097
(1,000 × 0.659) + (120 × 3.102) = 1,031

$$9 + \left(\frac{1,097 - 1,090}{1,097 - 1,031} \times 2\right) = 9 + \left(\frac{7}{66} \times 2\right) = 9.21\%$$

96 Working capital

(1) **Key areas of accounts receivable management**

There are four key areas of accounts receivable management.

(i) **Formulation of policy**

A **framework** needs to be established within which the management of accounts receivable in an organisation takes place. Elements of the framework to be considered include establishing the **terms of trade** such as the period of credit offered and **early settlement discounts.** The organisation must also consider whether to **charge interest** on overdue accounts. Laid-down procedures will be needed for granting credit to new customers and determining what to do when accounts become overdue.

(ii) **Assessment of creditworthiness**

Information relating to a new customer needs to be analysed. The information may come from bank references, trade references or credit reference agency reports.

The greater the amount of credit being granted and the possibility of repeat business, the more credit analysis is needed.

(iii) **Credit control**

Accounts receivable' payment records must be **monitored** continually. This depends on successful sales ledger administration.

Credit monitoring can be simplified by a system of **in-house credit ratings**. For example, a company could have five credit-risk categories for its customers. These credit categories or ratings could be used to decide either individual credit limits for customers within that category or the frequency of the credit review.

A **customer's payment record** and the **accounts receivable aged analysis** should be examined regularly, as a matter of course. Breaches of the credit limit, or attempted breaches of it, should be brought immediately to the attention of the credit controller.

(iv) **Collection of amounts due**

A company needs to have in place agreed procedures for dealing with overdue accounts. Examples include instituting reminders or final demands, chasing payment by telephone or making a personal approach. If this does not work, the company could refuse to grant any more credit to the customer, hire a specialist debt collecting agency or, as a last resort, take legal action.

The overall **debt collection policy** of the firm should be such that the administrative costs and other costs incurred in debt collection do not exceed the benefits from incurring those costs.

Section 3: 20 mark questions

97 Brick by Brick

(1) **Overhead absorption rate** is calculated as Rs. 400,000/40,000hrs = Rs. 10/hr

Costs and quoted prices for the GC and the EX using ABC to absorb overheads

		GC	*EX*
		Rs '000	Rs '000
Materials		3,500	8,000
Labour	30hrs × Rs. 150,000/hr	4,500	
	50hrs × Rs. 150,000/hr		7,500
Overheads			
– Supervisors	(W1)/(W2)	180	1,080
– Planners	(W1)/(W2)	280	1,400
– Property	(W1)/(W2)	1,800	3,000
Total cost		10,260	20,980
Quoted price		15,390	31,470

Workings

1 **Cost drivers**

	Costs Rs '000	*Number of drivers*	*Cost per Driver '000*
Supervisor	90,000	500	180
Planners	70,000	250	280
Property	240,000	40,000	6

2 **Cost per product in '000 Rs**

	Supervisor	*Planner*	*Property*
Cost per driver (W2)	Rs. 180	Rs. 280	Rs. 6
GC	180 × 1 = 180	280 × 1 = 280	6 × 300 = 1,800
EX	180 × 6 = 1,080	280 × 5 = 1,400	6 × 500 = 3,000

(2) The poor sales of GC may be due to **ineffective marketing** and advertising by BBB. Consumers may not be aware that the company offer garage conversions (GC). Alternatively, the methods used by the sales team to generate interest in GC may be limited and even discourage customers from placing work with the company.

BBB's **reputation** could also **contribute** to the **poor sales** of GC. BBB may be renowned for being unreliable and providing poor customer service, particularly in relation to GC.

Addressing each of the above factors will require careful planning and investment and will not be solved by simply reducing prices.

BBB could **lower the price** of a GC by 7%, in proportion with the reduction in costs. This could make the company more **competitive**.

Alternatively BBB could choose to only pass on 3% of the cost reduction to the customer. This will **increase the margin** on the GC.

The company may attempt to gain a foothold in the market by employing a policy of **penetration pricing** and offering cheap prices for the GC and the EX in the hope of attracting new customers.

There is no indication that sales of the EX are struggling. As such, it is likely that the 2% increase in the cost of the EX can be passed onto the customer without causing a significant reduction in revenue.

(3) Advocates of marginal costing believe that only the **variable costs** of making and selling a product or service should be identified. In the case of BBB this would only include material and labour costs. Absorption costing allocates and apportions overheads to individual products.

It could be argued that the marginal cost is more easily understood by the managers of BBB. However, even if **overheads** are not allocated to specific products they **still need to be paid for** and covered by sales in order for the company to show a profit. This means adding a **larger margin** onto the cost of each product. Marginal cost plus pricing is **easier** than absorption cost plus pricing because absorption costing requires **OAR calculations** and **estimates of unknown sales volumes**.

A modern alternative to absorption costing is **activity based costing**. Under this method, activities that cause costs (cost drivers) are identified and overheads are charged to products on the basis of their usage of each activity. For example, the number of site visits drives the cost of the supervisor.

In summary, businesses have to **cover all costs** including fixed overheads in order to make a profit, regardless of the pricing strategy that is adopted.

98 MN Llc

(1) **Key resource**

	Machine X Output	*Machine Y Output*	*Machine Z Output*
Up to 5 hours production time lost per week (= $^1/_8$ of maximum weekly production time)	$^7/_8 \times \frac{180}{4}$ = 39 TRLS		
Machine Y		52 TRLS	
Machine Z			30 TRLS

Key resource is therefore Machine Z time

	Rs
Selling price	2,000
Material cost	(600)
	1,400

Time on key resource $\frac{40 \text{ hours per week}}{30 \text{ TRLS}}$ = 1.3333 hours per TRL

Return per factory hour $\frac{1,400}{1.3333}$ = Rs. 1,050

Cost per factory hour

	Rs
Labour	5,500
Variable overhead	8,000
Fixed production costs $\frac{450,000}{48 \text{ weeks}}$	9,375
	22,875

Number of factory hours per week: 40

Cost per factory hour: Rs. 571.88

Throughput accounting ratio: $\frac{\text{Rs. } 1,050}{571.88}$ = 1.84

(2) The following **uses** for the throughput accounting ratio have been suggested.

(i) In a throughput environment, production priority must be given to the products best able to generate throughput, that is those products that maximise throughput per unit of key or bottleneck resource. The throughput accounting ratio can be used to **rank products**, the product with the highest value of this ratio being given the highest ranking.

(ii) The throughput accounting ratio compares the rate at which a product earns contribution with the rate at which production costs are incurred. If the ratio is greater than one, contribution is being generated at a rate faster than that at which production costs are being incurred. The opposite is true if the ratio is less than one. The ratio can therefore be used to determine **whether or not a product should be produced**.

(3) Two other ratios which may be used by a company operating throughput accounting

(i) **Schedule adherence**. This will highlight how well production schedules are being adhered to.

(a) Given that products should not be made unless there is a customer waiting for them, it is vital that production is not disrupted otherwise the customer will be kept waiting.

(b) Given that the ideal work in progress level is zero and buffer stocks are not held, it is vital that production schedules are kept to otherwise the entire production process will come to a halt.

(ii) **First-time capability (especially of output from the bottleneck process).** Below quality output at the bottleneck process would use up valuable resource time to transform it into saleable output, thereby reducing throughput capacity and increasing costs.

(4) **Contribution in throughput accounting and contribution in marginal costing are based on the same concept.**

(i) They are both calculated as the difference between sales revenue and variable costs.

(ii) They are both used to cover an organisation's fixed costs.

In both approaches, the contribution earned can be used **to assess the relative earning capabilities of different products** in order to determine an optimum production mix.

There are **differences** between the approaches, however. For example in marginal costing, material costs, labour costs and variable overheads are classified as variable costs. In throughput accounting, most factory costs, with the exception of materials costs, are classified as fixed costs.

99 A Co

(1)

	Maximum number of B1 units	*Maximum number of B2 units*
Department 1	480/12 = 40	480/16 = 30
Department 2	840/20 = 42	840/15 = 56

The bottleneck or limiting factor is labour in Department 1 as Department 2 has capacity to produce more of both B1 and B2.

(2) The **throughput approach** is based on throughput maximisation. Throughput is defined as **sales less direct materials**.

	B1	*B2*
	Rs.	Rs.
Sales price	500	650
Less: direct materials	(100)	(150)
	400	500

Throughput per minute of bottleneck resource is:

B1	*B2*
Rs	Rs
400/12 = 33.33	500/16 = 31.25

Contribution is maximised by producing 40 units of B1, the maximum number of B1 that can be produced, given the bottleneck resource of labour in Department 1.

The **maximum throughput contribution** is 40 × Rs. 400 = Rs. 16,000.

(3) There are a number of key features to any environmental management system.

Each environmental management system should contain an **environmental policy statement**. This can be developed through review of environmental impacts of materials, issues and products and of business issues arising.

Effective systems should take steps to ensure **regulatory compliance**. Environmental **audits** will help to confirm current legal requirements are being fulfilled as well as ensuring that the business is up-to-date with practical implications of likely **changes in legislation**.

Realistic and measurable **targets** should be set. Targets should be **quantified** within a specified time period. For example, reducing carbon dioxide emissions by X% within a 12 month period.

An effective system should be established to **account for environmental costs**. Key features include budgeting, forecasting, a clear structure of responsibilities as well as the establishment of an environmentally-friendly **culture** and performance appraisal process.

The business should make a **public declaration** of environmental standards that are met such as the ISO standards. This could lead to the business establishing a competitive advantage over competitors.

(4) **Categories of environmental costs**

There are many different definitions of environmental costs. The US Environmental Protection Agency has identified four types of environmental costs.

(i) **Conventional costs** such as raw materials and energy costs that have an impact on the environment.

(ii) **Potentially hidden costs** are relevant costs that are captured within accounting systems but may be 'hidden' within ' general overheads'.

(iii) **Contingent costs** are costs that will be incurred at a future date as a result of discharging waste into the environment such as clean-up costs.

(iv) **Image and relationship costs** are costs incurred to preserve the reputation of the business; for example, the costs of preparing environmental reports to ensure compliance with regulatory standards.

Note: You could have used an alternative framework for this such as prevention, appraisal, internal failure, external failure

100 WC

(1) **Sales price variances**

Kitchens	Rs millions
Revenue from 2,600 kitchens should have been (× Rs. 10 million)	26,000
But was (× Rs. 13 million)	33,800
	7,800 (F)
Bathrooms	
Revenue from 2,500 bathrooms should have been (× Rs. 7 million)	17,500
But was (× Rs. 6,100,000)	15,250
	2,250 (A)

	Rs millions
Total sales price variance (Rs. 7.8 million (F) – Rs. 2.25 million (A))	5,550 (F)

Sales mix profit variance

Kitchens	
Actual sales at budgeted mix (5,100 × 4/6)	3,400 jobs
Actual sales at actual mix	2,600 jobs
	800 jobs
× budgeted profit per kitchen (× Rs. 2 million)	Rs. 1,600,000 (A)
Bathrooms	
Actual sales at budgeted mix (5,100 × 2/6)	1,700 jobs
Actual sales at actual mix	2,500 jobs
	800 jobs
× budgeted profit per bathroom (× Rs. 1,500,000)	Rs. 1,200,000 (F)

	Rs'000
Total sales mix profit variance (Rs. 1.6 million (A) + Rs. 1.2 million(F))	400 (A)

Sales quantity profit variance

	Actual qty Std mix	*Std qty std mix*	*Difference in units*	*X std profit per unit*	*Variance in* Rs millions
Kitchens	3,400	4,000	600	2 million	1,200 (A)
Bathrooms	1,700	2,000	300	1.5 million	450 (A)
	5,100	6,000			1,650 (A)

(2) **Operating statement for the year**

	Kitchens			*Bathrooms*			*Total*
	Rs million	Rs million	Rs million	Rs million	Rs million	Rs million	Rs million
Budgeted profit			8,000			3,000	11,000
Sales variances	(F)	(A)		(F)	(A)		
Sales price variance	7,800				2,250		5,550
Sales quantity profit variance		1,200			450		(1,650)
Sales mix		1,600		1,200			(400)
			5,000			(1,500	
Actual sales less standard cost of sales			13,000			1,500	14,500
Cost variances							
Direct cost price (W1)		6,500		750			(5,750)
Central services expenditure (W2)							(2,500)
Central services volume (W3)							(2,250)
			(6,500)			750	
Actual profit/(loss)			6,500			2,250	4,000

Workings

1 *Direct cost variance*

Kitchens	Rs million
Should have cost (2,600 × Rs. 5,500)	14,300
But did cost (2,600 × Rs. 8,000)	20,800
	6,500 (A)
Bathrooms	
Should have cost (2,500 × Rs. 3,000)	7,500
But did cost (2,500 × Rs. 2,700)	6,750
	750 (F)

2 *Central services expenditure variance*

	Rs million
Budgeted expenditure (6,000 jobs × Rs. 2,500 recharge per job)	15,000
Actual expenditure	17,500
	2,500 (A)

3 *Central services volume variance*

	Jobs
Budgeted number of jobs (4,000 + 2,000)	6,000
Actual number of jobs (2,600 + 2,500)	5,100
	900 (A)

900 jobs × Rs. 2,500,000 (recharge per job) Rs. 7,250 million

(3) ~~(i)~~ The company **budgeted** to make a **profit** of **Rs. 8,000 million on the kitchens and Rs. 3,000 million on the bathrooms**. In fact it only made **Rs. 6,500 million on the kitchens and Rs. 2,250 million on the bathrooms**.

Kitchens

The company **didn't sell as many kitchens as** it had **budgeted** for (only 2,600 compared to 4,000) and this accounts for the **adverse variance** of Rs. 2,800 million shown above.

However, it sold the kitchens at a **higher selling price** (Rs. 13 million per kitchen compared to the budgeted Rs. 10 million) and this accounts for the **favourable variance** of Rs. 7.800 million shown above.

The **direct cost per kitchen was higher** than the budgeted amount and this led to an **adverse variance** of Rs. 6,500 million. The **total central services cost was originally budgeted at Rs. 15,000 million but the actual costs were Rs. 17,500 million**. This gave rise to an adverse variance.

Bathrooms

In the case of the bathrooms, the company actually **sold 500 more bathrooms than it had budgeted** to sell, leading to a **favourable variance** of Rs. 750 million.

Unfortunately the **average selling price per bathroom was only Rs. 6,100,000** compared to the budget of Rs. 7,000,000. This caused an **adverse variance** of Rs. 2,250 million.

The **direct costs per bathroom were Rs. 300,000 less than budgeted** and this caused a **favourable direct cost variance** of Rs. 750 million. As explained for the kitchens, the central services cost gave rise to an adverse variance.

(ii) It seems that the budgeting and reporting process has been **over simplified**. The following changes could be implemented.

Bespoke and off-the-shelf costs

The company installs both **bespoke designs** and **off the shelf designs**. The budgeted revenue and costs for these really need to be **split out** because it is likely that they will be very different. For example the design process for a bespoke kitchen is likely to cost more than an off-the-shelf design.

The operating statement suggests that the budgeted costs are too low but more could be revealed by splitting the costs into bespoke and off-the-shelf.

Materials, labour and other costs

It would also help to split the costs into material, labour and other expenses. This would help to identify areas where variances, for example the Rs. 6,500 million on kitchens, have occurred. It should help to pinpoint the **causes** for the over–spending.

Central services costs

The central services costs include design, administration and finance. These costs are charged on the basis of the number of jobs. This does not seem like a very fair way of allocating the costs. For example the administration for a bespoke kitchen would not necessarily be the same as the administration for an off-the-shelf bathroom. It would be worth investigating the **cost drivers** for these costs and allocating them on a fairer basis.

It also seems that there is **no incentive** for the central services departments to keep their costs down as the costs are re-charged to the kitchen and bathroom departments. For controllable costs, the central services should be **held responsible** for these costs and only allowed to re-charge them where it is justified. This should help to encourage **goal congruence** between the departments.

101 FA/FB Fertiliser

(1) (i) **Planning variance**

	Rs '000
Revised standard cost (25,000 units × 0.25kg × Rs. 14.50)	90,625
Original standard cost (25,000 units × 0.25kg × Rs. 12)	75,000
	15,625 (A)

Operational price variance

	Rs '000
6,450 should have cost (× Rs. 14.50)	93,525
But did cost	94,000
	475 (A)
Operational usage variance	
25,000 units should have used (× 0.25kg)	6,250
But did use	6,450
Variance in kg	200 (A)
× revised standard cost per kg	× Rs. 14.50
	Rs. 2,900 (A)

(ii) One of the problems of planning variances is that it is often difficult even with hindsight to decide what the realistic standard should have been. How is the revised standard set and is the information correct?

Another problem is that it may become too easy to justify all of the variances as being due to bad planning, so no operational variances will be highlighted. There must be a good reason why there was an error in the planning otherwise it could just be an excuse to shift the blame from operations to the planning manager.

(2) **The business environment**

Variance analysis (and standard costing systems) were **developed** when the **business environment** was more **stable** and **less prone to change**. The current business environment is more dynamic and it is not possible to assume stable conditions. This means that the use of variance analysis for planning and control purposes is not always ideal.

Quality

Modern businesses need to plan for and control quality. Variance analysis concentrates on a **narrow range of costs** only and does not give sufficient attention to issues such as quality and customer satisfaction. Today's business environment is more focused on **continuous improvement** in a **total quality** environment.

Building in continual improvement

Predetermined fixed standards are at odds with the philosophy of **continual improvement** inherent in a total quality management programme, as continual improvements are likely to alter methods of working, prices, quantities of inputs and so on.

Responsibility for variances

Standard costing systems make **individual managers responsible** for the variances relating to their part of the organisation's activities. A TQM programme, on the other hand, aims to make **all personnel** aware of, and responsible for, the importance of supplying the customer with a quality product.

Standard costing – the wrong focus

The use of standard costing in the modern manufacturing environment can make managers **focus their attention on the wrong issues**. For example, **adverse efficiency variances** are meant to be avoided, which means that managers need to prevent idle time and keep up production. In **a just-in-time environment**, however, action to **eliminate idle time** could result in the **manufacture of unwanted products** that would need to be held in store and might eventually be scrapped, which is totally at odds with the aims of JIT.

It could therefore be argued that standard costing and variance analysis are irrelevant in today's manufacturing world.

Standard costing can be relevant

Despite the arguments set out above, standard costing and variance analysis can be relevant in the modern manufacturing environment.

Standard costing and variance analysis can be usefully **employed by modern manufacturing organisations as follows**.

- **Planning.** Even in a TQM environment, budgets will still need to be quantified. For example, the planned level of prevention and appraisal costs needs to be determined. Standards, such as 'returns of a particular product should not exceed 1% of deliveries during a budget period', can be set.
- **Control.** Cost and mix changes from plan will still be relevant in many processing situations.
- **With ABC.** Standard costing can be used to control the costs of unit-level activities (which consume resources in proportion to the number of units produced) and to manage those overhead costs that are fixed in the short term, but variable in the longer term.

102 M Plc

(1)

	Original budgeted 1	*Flexed budgeted 2*	*Actual Costs 3*	*Variance (3 – 2)*
Assembly labour hours	6,400	7,140	7,140	
	Rs	Rs	Rs	Rs
Variable costs				
Assembly labour (W1–3)	49,920	55,692	56,177	485 (A)
Furniture packs (W4)	224,000	249,900	205,000	44,900 (F)
Other materials (W5)	23,040	25,704	24,100	1,604 (F)
Variable overheads (W6)	34,560	38,556	76,340	37,784 (A)
	331,520	369,852	361,617	8,235

	Original budgeted 1	*Flexed budgeted 2*	*Actual Costs 3*	*Variance (3 – 2)*
Fixed costs				
Manager	2,050	2,050	2,050	–
Stepped-fixed cost (W6)	18,500	27,000	27,000	–
Total departmental fixed costs	20,550	29,050	29,050	–
Central costs	9,000	9,000	9,000	–
	361,070	407,902	399,667	8,235 (F)

Workings

1 Both budgeted and actual assembly labour costs given include manager's fixed salary of Rs. 2,050 which has to be deducted

Rs. 51,970 – Rs. 2,050 = Rs. 49,920

2 Budgeted assembly labour costs are flexed to reflect actual labour hours by multiplying the cost by:

$$\frac{\text{Actual hours}}{\text{Bugeted hours}}$$

$$\text{Rs. } 49{,}920 \times \frac{7{,}140 \text{ hours}}{6{,}400 \text{ hours}} = \text{Rs. } 55{,}692$$

3 We need to deduct the assembly manager's fixed salary of Rs. 2,050 from the actual costs of Rs. 58,227

Rs. 58,227 – Rs. 2,050 = Rs. 56,177

4 We need to flex the original budget for the cost of furniture packs to reflect the actual labour hours worked.

$$\text{Rs. } 224{,}000 \times \frac{7{,}140 \text{ hours}}{6{,}400 \text{ hours}} = \text{Rs. } 249{,}900$$

5 We need to flex the original budget for other materials to reflect the actual labour hours worked

$$\text{Rs. } 23{,}040 \times \frac{7{,}140 \text{ hours}}{6{,}400 \text{ hours}} = \text{Rs. } 25{,}704$$

6 The budgeted overheads include a fixed cost of Rs. 9,000 and a stepped-fixed cost which we need to work out using the high-low method. The stepped fixed cost changes when the assembly hours exceed 7,000 hours. In order to identify these stepped fixed costs we compare the overhead costs for the two different levels of labour hours at 7,500 and 10,000 hours respectively.

At 7,500 assembly labour hours we have: a + 7,500 b = Rs. 76,500

At 10,000 assembly labour hours we have: a + 10,000 b = Rs. 90,000

Where, a is defined below as:

a = Stepped fixed cost + Rs. 9,000
a + 10,000 b = Rs. 90,000 (1) a + 7,500 b = Rs. 76,500 (2)

Subtracting (2) from (1) we get:

2,500 b = Rs. 13,500

$$b = \frac{\text{Rs. } 13,500}{2,500} = 5.4$$

Substituting the value of b in (1)

a + 5.4 × 10,000 = 90,000
a = 90,000 – 54,000 = 36,000
a = stepped fixed costs at 7,000 hours + Rs. 9,000 = Rs. 36,000

Stepped fixed costs at 7,000 hours = Rs. 36,000 – Rs. 9,000 = Rs. 27,000

To find the stepped fixed cost component at 5,000 hours, we substitute the value of b = 5.4 in the following equation

a_1 + 5,000 b = Rs. 54,500

Where a_1 is the stepped fixed cost at 5,000 units (including the central fixed cost of Rs. 9,000)

a_1 + 5,000 × 5.4 = Rs. 54,500

a_1 = Rs. 27,500

Deducting the central fixed cost of Rs. 9,000, the stepped fixed cost for 5,000 units is Rs. 27,500 less Rs. 9,000 = Rs. 18,500.

(2) (i) The revised format of the statement is **more helpful** as it has been **flexed** to the actual level of activity and therefore **compares like with like**.

(ii) The revised format **separates costs** into variable (and hence **controllable**) costs and fixed costs or central costs (and therefore **uncontrollable**). This will **facilitate analysis**, performance measurement and responsibility accounting.

(iii) The format originally submitted has some **inconsistencies** which make **comparison** very **difficult**. In addition to the fact that the format was not comparing like with like, the manager's fixed salary was included in overheads when labour assembly hours related only to the variable labour input.

(3) **Advantages of participative budgets**

(i) They are based on information from employees most familiar with the department

(ii) Knowledge spread among several levels of management is pulled together

(iii) Morale and motivation is improved

(iv) They increase operational managers' commitment to organisational objectives

(v) In general they are more realistic

(vi) Co-ordination between units is improved

(vii) Specific resource requirements are included

(viii) Senior managers' overview is mixed with operational level details

(ix) Individual managers' aspiration levels are more likely to be taken into account

The allocation of overheads in M plc is likely to vary considerably depending on the size, complexity and value of the furniture being assembled. It is, therefore, important to involve employees with detailed knowledge of the process. This will not only draw on useful experience but also increase motivation and commitment.

Disadvantages of M plc moving to a system of participative budgeting

(i) They consume more time

(ii) An earlier start to the budgeting process may therefore be required

(iii) They may cause managers to introduce budgetary slack and budget bias

(iv) Managers may, therefore, set 'easy' budgets to ensure that they are achievable

(v) They can support 'empire building' by subordinates

In considering the advantages of introducing participative budgeting M plc needs to be aware of the potential disadvantages. The most important potential problem, apart from participative budgets requiring more resource and taking longer to prepare, is the possible introduction of slack.

Negotiated style of budgeting

A **negotiated budget** is a 'budget in which budget allowances are set largely on the basis of negotiations between budget holders and those to whom they report.'

At the two extremes, budgets can be **dictated from** above or simply **emerge from below** but, in practice, different levels of management often agree budgets by a process of **negotiation**. In the **imposed** budget approach, **operational** managers will try to negotiate with senior managers the budget targets which they consider to be **unreasonable** or **unrealistic**. Likewise senior management usually review and revise budgets presented to them under a **participative approach** through a process of **negotiation** with lower level managers. Final budgets are therefore most likely to lie **between** what top management would **really like** and what junior managers believe is **feasible**. The budgeting process is hence a **bargaining process** and it is this bargaining, which is of vital importance, determining whether the budget is an effective management tool or simply a clerical device.

103 ZBB

(1) **Difficulties when budgeting in the public sector**

The main objective for most companies is to **maximise profit**. Effective budgeting can assist in meeting this objective by focussing efforts on reducing certain costs and increasing revenues by a certain amount or percentage. The **objectives of public sector organisations** are more **difficult to define in a quantifiable way**.

The **objectives of public sector organisations** such as hospitals are likely to **be largely qualitative**. For example, ensuring that ambulances reach patients within 20 minutes from an emergency call being received. Such objectives are difficult to define in a quantifiable way, whilst identifying how the objective is actually achieved can also be problematic.

Another problem why budgeting is so difficult in public sector organisations is that outputs in the public sector can seldom be measured in a way that is generally agreed to be meaningful. Whilst outputs for private companies can be measured in terms of sales revenue, outputs in the public sector are harder to pin down. For example in the education sector, are good exam results alone an adequate measure of the quality of teaching? In the public sector, **comparisons are often made between the funds available and the funds actually required**. Therefore, public sector budgeting naturally focuses on inputs, rather than the relationship between inputs and outputs.

Public sector organisations are under constant pressure to prove that they are economical, efficient and effective (offering value for money). **Resources are always kept to a minimum and each item of expenditure must be justified**. This makes the budgeting process more difficult.

(2) **Incremental budgeting**

Incremental budgeting **bases the budget on the current year's results plus an extra amount for estimated growth or inflation next year**. This form of budgeting is a reasonable procedure if current operations are as effective, efficient and economical as they can be.

Zero-based budgeting (ZBB)

ZBB rejects the assumption that underpins the concept of incremental budgeting; that next year's budget can be based on this year's costs plus an extra amount for estimated growth or inflation. ZBB involves **preparing a budget for each cost centre from a zero base**. Every item of **expenditure must be justified** in its entirety in order to be included in next year's budget.

(3) **Stages in zero-based budgeting**

ZBB involves three main stages.

Define activities (decision packages)

At the first stage, management identify the **key activities** within the organisation. These activities are described within a decision package. The decision package is originally **prepared at a base level** which shows the minimum level of resource required to meet the organisations objectives. **Incremental packages** may be prepared to show any **additional work** that could be done, at what cost and for what benefit.

Evaluate and rank each activity

Management will then rank each activity (decision package) on the basis of its benefit to the organisation. Minimum work requirements (those that are essential to get the job done) will be given high priority and so too will work which meets legal obligations. This process will **help management to decide what to spend and where to spend it**.

Allocate resources

At the final stage, management allocate resources in the budget **according to the funds available and the evaluation and ranking of the competing packages**.

(4) **The limitations of ZBB**

The major limitation of ZBB is the volume of **extra paperwork** created. Assumptions about costs and benefits in each package must be continually updated and new packages must be developed as new activities occur within the organisation.

ZBB is likely to require **management skills both in constructing decision packages and in the ranking process**. If management do not possess such skills they will require training in ZBB techniques which takes time and money.

The ranking process can also prove problematic. It can be difficult **to rank packages which appear to be equally vital**, for legal or operational reasons. Furthermore, it is difficult to rank activities which have **qualitative rather than quantitative benefits**.

ZBB can **give the impression that all decisions have to be made in the budget**. As a result, management may feel unable to carry out new ideas because they were not approved by a decision package and did not pass through the ranking process.

104 GHK

(1)

Product	*G* Rs '000	*H* Rs '000	*J* Rs '000	*K* Rs '000
Selling price (W1)	10.00	20.00	15.00	30.00
Material A (W2)	4.20	5.60	2.10	8.40
Material B (W3)	2.00	2.00	4.50	12.00
Direct labour (W4)	2.00	8.00	7.50	3.00
Overhead (W5)	1.00	3.00	3.00	3.00
Total costs	9.20	18.60	17.10	26.40
Relevant contribution per unit	0.80	1.40	(2.10)	3.60
Relevant contribution per Rs of Material B (W6)	0.40	0.70	(0.47)	0.30

Workings

1 Take the revenue in Rs as stated in the question and divide by the number of units. So for product G, take Rs. 30,000,000 and divide by 3,000 units to get Rs. 10 per unit selling price.

2 Costs shown in the budget are based on Rs. 5,000 per kg but the relevant cost will be the Rs. 7,000 replacement cost of material A. So taking Product G as an example:

Cost of material A per unit of G was $\frac{\text{Rs. } 9,000,000}{3,000 \text{ units}}$ = Rs. 3,000

Kgs of material A per unit of G = $^{\text{Rs. } 3,000}/_{\text{Rs. } 5,000}$

Revised cost of material A per unit of G = $(^{\text{Rs. } 3,000}/_{\text{Rs. } 5,000}) \times$ Rs. 7,000 = Rs. 4,200

3 The relevant cost here is based on the Rs. 10,000 per kg replacement cost so there is no need to substitute a replacement cost as in working 2 above and you can use the figures straight from the budget.

4 Likewise, the relevant cost here is the Rs. 10,000 hourly rate and you can take the cost from the budget.

5 You need to use the high-low method to calculate the variable element of the overheads, after deducting the specific fixed cost of Rs. 1,000.

Product	*G*		*H*		*J*		*K*	
	Rs '000	*Units*	Rs '000	*Units*	Rs'000	*Units*	Rs '000	*Units*
High volume	5,000	3,000	12,000	3,000	10,000	3,000	10,000	3,000
Low volume	7,000	5,000	18,000	5,000	16,000	5,000	16,000	5,000
Difference	2,000	2,000	6,000	2,000	6,000	2,000	6,000	2,000
	(1)							
Variable cost per unit ((1)/(2))	$\frac{2,000,000}{2,000}$ = Rs. 1,000		Rs. 3,000		Rs. 3,000		Rs. 3,000	

6 Let's consider product G again. The cost of material B per the table above is Rs. 2,000 per unit. Apply this to the relevant contribution per unit you have already worked out and you will get the relevant contribution per Rs of material B.

(2) **Optimum production plan and financial penalty**

Step 1 **Calculate the contribution from the contract to supply the major customer**

The data for units comes straight from the question and you should then use the relevant contributions calculated in part (1) for each product.

	G	*H*	*J*	*K*	*Total*
Units in the contract	500	1,600	800	400	
Relevant contribution per unit (Rs)	800	1,400	(2,100)	3,600	
Total contribution (Rs)	400,000	2,240,000	(1,680,000)	1,440,000	2,400,000

Step 2 **Calculate the contribution from the alternative use of resources**

First, you need to compare demand and the optimum production plan for each product. These are stated in the question in the body of the question and in part (2). Clearly you will only want to produce more where demand is greater than capacity, and you can look at switching resources to meet this demand.

Product	*G*	*H*	*J*	*K*
Demand for Units	3,600	3,000	3,000	4,000
Optimum production plan	4,100	4,600	800	2,417
Therefore spare capacity	0 (W1)	0 (W1)	2,200 (W2)	1,583 (W3)
Plus additional spare capacity if no contract				400
Total useful spare capacity				1,983

Workings

1 There are two products where demand is more than capacity, so there is no spare capacity.

2 You would not want to produce more of product J as this has a negative contribution, so look at producing more of product K.

3 The demand from other customers for product K is 4,000 units but the optimum production plan recommends a production level of 2,417 units. Without the contract, the production level would be 2,417 – 400 = 2,017 units, so there are 1,983 units of unsatisfied demand.

Then look at switching resources from the minimum contract to satisfy the demand for product K.

Product	*G*	*H*	*J*	*K*	*Total*
Units in the contract	5	1,60	8	4	
Material B (kg) per unit (W)	0	0.20	0	1	
Total kg released	1	32	3	4	1,260

Working

Refer to the budget in the question. For product K , for example, at 3,000 units the cost of material B is Rs. 36,000,000 so the cost per unit is Rs. 12,000. Divide by the expected cost per unit for material B of Rs. 10,000 to give 1.20 kg of material B per unit of K.

Contribution from alternative use of resources

This all relates to product K

Capacity in units (see above)	1,983
Material B (kg) per unit (see above)	1.20
Total kg required (1,983 × 1.2 kgs)	2,380
Available kg from switching (see above)	1,260
Additional units from available kgs (1,260 kgs/1.2 kgs per unit) (W)	1,050
Contribution from alternative use of resources (1,050 × Rs. 3.60)	Rs. 3,780,000

Working

The 1,983 units would require (× 1.2 kgs) 2,379.6 kgs of material B, which is more than the 1,260 made available if the contract

does not go ahead. Therefore the additional units are limited by the 1,260 kgs made available.

With the extra 1,260 kgs, an extra 1,050 units of K can be produced (divide by 1.2).

Step 3 Lastly, compare the contribution from the contract with the contribution from the alternative use of resources and state the financial penalty at which the company would be indifferent between meeting the contract or paying the penalty.

Minimum contract

	Rs
Total contribution (Step 1 above)	2,400,000
Less fixed cost not incurred (W)	(1,000,000)
Net contribution from the minimum contract	1,400,000
Contribution from alternative use of resources	3,780,000

Difference between two options (Rs. (3,780,000 – 1,400,000)) = Rs. 2,380,000

Working

If the contract did not go ahead product J would not be produced (because it has a negative contribution) and specific fixed costs of Rs. 1,000 would be saved, so the contribution from the contract is a net figure of Rs. 1,400,000.

Conclusion. The penalty at which it is worthwhile to switch from the contract to other production is therefore Rs. 2,380,000.

Alternatively:

If GHK is indifferent between meeting the contract and paying the penalty:

Penalty + lost contribution from contract = extra contribution from production of additional product K

Therefore penalty = Rs. 3,780,000 – Rs. 1,400,000 = Rs. 2,380,000

(3) **Relevant contribution to sales ratios for all four products**

Take the information calculated in part (1) above and use to calculate C/S ratios for each product.

Product	*G*	*H*	*J*	*K*
	Rs	Rs	Rs	Rs
Selling price	10,000	20,000	15,000	30,000
Relevant contribution	0.80	1.40	(2.10)	3.60
Contribution to sales ratios (%)	8%	7%	(14%)	12%

(4) **Sketch a graph showing multi product profit volume (PV) chart**

Step 1 A P/V chart has revenue on the x axis and profit on the y axis, and so for each product you need to know the revenue that can be earned from total market demand (contract + other customers) and the profit from this level of revenue. Remember that the limiting factor restriction on material B no longer applies as demand will be the sum of that for the minimum contract plus the demand expected from other customers.

Product	*G*	*H*	*J*	*K*	*Total*
Total demand (units) (W1)	4,100	4,600	3,800	4,400	
	Rs	Rs	Rs	Rs	Rs
Sales revenue (W2) (Rs'000)	41,000	92,000	57,000	132,000	322,000
Contribution to sales ratios (%) (W3)	8%	7%	(14%)	12%	
Contribution (Rs'000)	3,280	6,440	(7,980)	15,840	17,580

Workings

1 You need to add the demand from the minimum contract to the other demand stated, for each product. All information is in the question.

2 Use the selling price you calculated in part (1) × total demand for units

3 From part (3)

Step 2 You need a 'starting point' for the graph (ie at the point of nil revenue on the x axis) and so you need to determine the profit when revenue is nil (the point on the y axis). Profit – or loss – when revenue is nil = fixed costs.

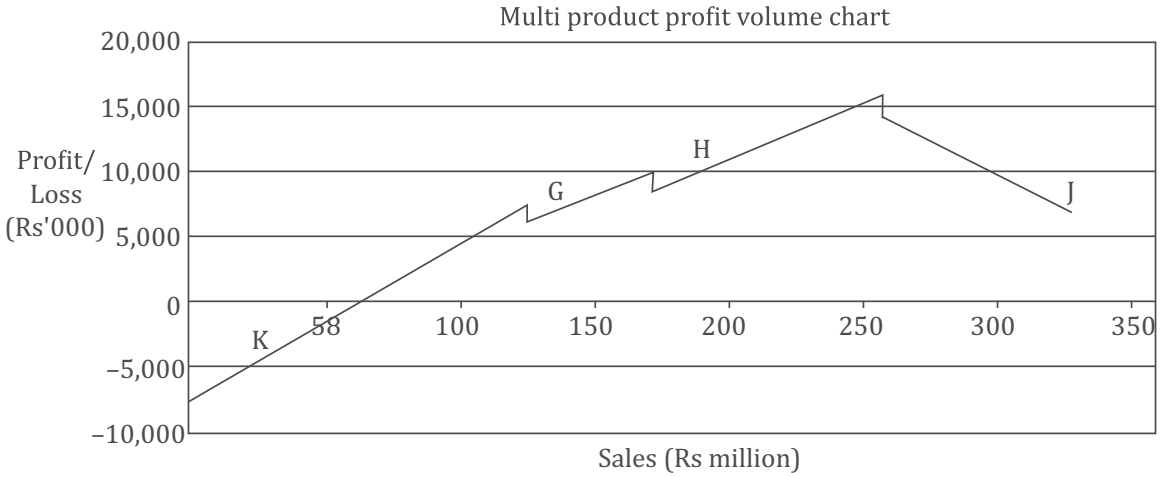
Product	*G*	*H*	*J*	*K*	*Total*
	Rs '000	Rs '000	Rs '000	Rs '000	Rs '000
Overhead costs per the question	6,000	13,000	11,000	11,000	
Units	3,000	3,000	3,000	3,000	
Variable overhead cost per unit (from (1))	Rs. 1	Rs. 3	Rs. 3	Rs. 3	
Total variable costs (units × variable cost per unit)	3,000	9,000	9,000	9,000	
Fixed cost (total overhead costs – total variable costs)	3,000	4,000	2,000	2,000	11,000
Less avoidable fixed cost (from note 4 of question)					(4,000)
Fixed cost at which sales are nil					7,000

Step 3 The question states that the products are to be plotted in order of their C/S ratios so (from (3) they need to be plotted in the order KGHJ.

You now need to work out cumulative revenues and profits

As each product is produced, a directly attributable fixed cost is incurred – we'll assume – immediately ie at zero revenue.

Products	*Revenue*	*Cumulative revenue (x axis coordinate)*	*Profit*	*Cumulative profit (y axis coordinate)*
	Rs'000	Rs'000	Rs'000	Rs'000
None	None	None	(7,000)	(7,000)
Start selling K	None	None	(1,000)	(8,000)
Finish selling K	132,000	132,000	15,840	7,840
Start selling G	None	132,000	(1,000)	6,840
Finish G	41,000	173,000	3,280	10,120
Start selling H	None	173,000	(1,000)	9,120
Finish selling H	92,000	265,000	6,440	15,560
Start selling J	None	265,000	(1,000)	14,560
Finish selling J	57,000	322,000	(7,980)	6,580



105 NCL

(a) Divisional management's decision making will be influenced by the fact that their **annual bonus payments** are calculated with reference to **ROI** earned during the **first two years** of an investment. We therefore need to look at ROI of the three projects in Years 1 and 2.

		North	*East*	*South*
		Rs '000	Rs '000	Rs '000
Year 1	Cashflow	6,000	11,500	12,000
	Depreciation:			
	24 million /4 years	(6,000)		(6,000)
	24 million /3 years		(8,000)	
	Profit	0	3,500	6,000
	Average capital:			
	(24 million + 18 million)/2	21,000		21,000
	(24 million + 16 million)/2		20,000	
	ROI (profit ÷ average capital) × 100%)	**0**	**17.5%**	**28.6%**
Year 2	Cashflow	8,000	11,500	10,000
	Depreciation:			
	24 million/4 years	(6,000)		(6,000)
	24 million/3 years		(8,000)	
	Profit	2,000	3,500	4,000
	Average capital:			
	(18 million + 12 million)/2	15,000		15,000
	(16 million + 8 million)/2		12,000	
	ROI	**13.3%**	**29.2%**	**26.7%**

The management of the IOA division will prefer to **invest in the South project** as it has by far the highest return on investment in Year 1 and an ROI only marginally lower than that of the East project in Year 2 and so will result in higher bonus payments for them in Years 1 and 2. They will not look further than this to consider the whole life of each project. This reflects a **short-term** focus that is at odds with the view of the board of directors of NCL. As the latter's objective is the maximisation of shareholder wealth over the longer term, the board is likely to choose the North project as this has the highest calculated NPV.

The **incentive plan** motivates management to adopt a **short-term focus** which is detrimental to the organisation as a whole and leads to a **lack of goal congruence** and **dysfunctional decision making**.

The **attitude to risk** of the directors of NCL will have an impact, however. The East project has a life of three years (compared with four for North and South projects) which means that the cash flow estimates associated with it are less subject to uncertainty.

(b) An alternative way of measuring the performance of an investment centre, instead of using ROI, is residual income (RI) and its use as a basis for a performance measurement system has a number of **advantages**.

Residual income is a measure of the centre's profits after deducting a notional or imputed interest cost. The imputed cost of capital might be the organisation's cost of borrowing or its weighted average cost of capital.

Residual income **increases for investments earning above the cost of capital**, so if it is used as a basis for performance measurement it will **result** in **projects** being undertaken that will increase shareholder value. It also allows **different costs of capital** to be applied to investments with different risk characteristics so it is a **more flexible measure than ROI**.

However using net book value at the start of each year, and depreciating on a straight line basis to a nil residual value, **tends to distort project returns in the early years** of a project's life. RI also cannot be used to make comparisons between investment centres as it is an **absolute** measure of performance. Finally, RI **does not relate the size of a centre's income to the size of the investment** other than indirectly through the interest charge.

(c) **West project**

	Cashflow Rs m	*Discount factor* 12%	*Discounted cash flow* Rs million
Year 0	(12,000)	1.000	(12,000)
Years 1–4	5,000	3.037	15,185
NPV			3,185

NCL needs to consider whether it is strategically appropriate to then spend a further Rs. 4,000 million in Year 4 on redressing the environmental damage caused by the project.

Environmental repair

	Rs million
NPV as calculated	3,185
Year 4 expenditure (Rs. 2,000 million × 0.636)	(1,272)
NPV	1,913
Further expenditure (Rs. 2,000 million × 0.636)	(1,272)
NPV	641

Depending upon how **socially responsible** the board of NCL is and whether they think they have a **moral obligation** to clear up their **own pollution**, it could find the NPV of the West project reduced from Rs. 1,913 million (after the minimum required clean-up expenditure) to Rs. 641 million. Polluted water will create substantial **negative public opinion** and publicity for the company, and it may find its future activities limited, or at least subjected to intense scrutiny, if **pressure groups** target the company and make it difficult to undertake similar projects in the future. Being seen as a socially responsible company will promote local goodwill and could bring greater long-term benefits.

106 BDU

(1)

		Price		
		Rs. 425	Rs. 500	Rs. 600
Variable cost	Rs. 170	255,000 (W1)	240,900 (W3)	180,600
	Rs. 210	215,000 (W2)	211,700	163,800
	Rs. 260	165,000	175,200	142,800

Workings

1 (425 – 170) × 1,000 = Rs. 255,000

2 (425 – 210) × 1,000 = Rs. 215,000

3 (500 – 170) × 730 = Rs. 240,900

(2) **Maximax**

The **maximax criterion** looks at the **best possible results**. Maximax means 'maximise the maximum profit'. In this case, we need to **maximise the maximum contribution**.

Demand/price	*Maximum contribution*
1,000/Rs. 425	Rs. 255,000
730/Rs. 500	Rs. 240,900
420/Rs. 600	Rs. 180,600

BDU would therefore set a price of **Rs. 425**.

Maximin

The **maximin** decision rule involves choosing the outcome that offers the **least unattractive worst outcome,** in this instance choosing the outcome which **maximises the minimum contribution**.

Demand/price	*Minimum contribution*
1,000/Rs. 425	Rs. 165,000
730/Rs. 500	Rs. 175,200
420/Rs. 600	Rs. 142,800

BDU would therefore set a price of **Rs. 500**.

Minimax regret

The **minimax regret** decision rule involves choosing the **outcome that minimises the maximum regret** from making the wrong decision, in this instance choosing the outcome which **minimises the opportunity loss** from making the wrong decision.

We can use the calculations performed in (a) to draw up an **opportunity loss table**.

Variable cost	*Price*		
	Rs. 425	Rs. 500	Rs. 600
Rs. 170	–	Rs. 14,100	Rs. 74,400 (W1)
Rs. 210	–	Rs. 3,300	Rs. 51,200 (W2)
Rs. 260	Rs. 10,200	–	Rs. 32,400 (W3)
Minimax regret	Rs. 10,200	Rs. 14,100	Rs. 74,400

Minimax regret strategy (price of Rs. 425) is that which minimises the maximum regret (Rs. 10,200).

Workings

1 At a variable cost of Rs. 170 per day, the best strategy would be a price of Rs. 425. The opportunity loss from setting a price of Rs. 600 would be Rs. (255,000 – 180,600) = Rs. 74,400.

2 At a variable cost of Rs. 210 per day, the best strategy would be a price of Rs. 425. The opportunity loss from setting a price of Rs. 600 would be Rs. (215,000 – 163,800) = Rs. 51,200.

3 At a variable cost of Rs. 260 per day, the best strategy would be a price of Rs. 500. The opportunity loss from setting a price of Rs. 600 would be Rs. (175,200 – 142,800) = Rs. 32,400.

(3) **Expected values**

Where probabilities are assigned to different outcomes we can evaluate the worth of a decision as the **expected value**, or weighted average, of these outcomes. The principle is that when there are a number of alternative decisions, each with a range of possible outcomes, the optimum decision will be the one which gives the highest expected value. The expected value will **never actually occur**.

Expected values are more valuable as a guide to decision making where they refer to outcomes which will occur **many times over**. Examples would include the probability that so many customers per day will buy a can of baked beans, the probability that a customer services assistant will receive so many phone calls per hour, and so on.

We have not been given information on probabilities of each demand occurring for BDU's pushchairs and it is unlikely that demand will be sufficiently predictable to use this technique successfully.

Sensitivity analysis

Sensitivity analysis can be used in any situation so long as the relationships between the key variables can be established. Typically this involves changing the value of a variable and seeing how the results are affected.

For example, BDU could use sensitivity analysis to estimate by **how much costs and revenues would need to differ** from their estimated values before the decision would change or to estimate whether a decision would

change if estimated costs were **x% higher** than estimated, or estimated revenues **y% lower** than estimated.

Sensitivity analysis can help to **concentrate management attention** on the most important factors and can be particularly useful when launching a new product.

107 Pixie Pharmaceuticals

(1)

	Fairyoxide	*Spriteolite*	*Goblinex*	*Total*
	Rs. m	Rs. m	Rs. m	Rs. m
Sales value	80	200	160	440
Variable costs	56	136	112	304
Contribution	24	64	48	136
Fixed costs	16	40	32	88
Profit	8	24	16	48

If we produce our three drugs in-house our total profits are Rs. 48m.

(2)

	Fairyoxide	*Spriteolite*	*Goblinex*
	Rs'000	Rs.'000	Rs.'000
Unit variable costs:			
direct material	0.80	1.00	0.40
direct labour	1.60	1.80	0.80
direct expense	0.40	0.60	0.20
Total variable cost	2.80	3.40	1.40
Imported price	2.75	4.20	2.00
Saving/(increased cost) of purchasing	0.05	(0.80)	(0.60)

On the basis of cost only, we should continue to produce Spriteolite and Goblinex but Fairyoxide should be purchased from the overseas producer.

(3) The recommendation in (2) will increase profit because of the saving of Rs. 50 per unit of Fairyoxide.

$\therefore$ Increased profit = Rs. 50 $\times$ 20,000 = Rs. 1m
$\therefore$ Total profit will be Rs. 49m

If we buy Fairyoxide from the overseas producer total profit will increase by Rs. 1m to Rs. 49m

(4) **Other matters to be considered before importing drugs**

(i) **Quality** is of vital importance in the manufacture of pharmaceuticals and the management would have to be convinced that the quality of production by the overseas producer would be acceptable. It will be harder to check quality if a supplier is overseas.

(ii) The management will also need to be sure that **continuity of supply** can be guaranteed

(iii) The quoted price may not be fixed and could be affected by changes in **exchange rates**.

(iv) If Fairyoxide is no longer produced by the company, management should investigate whether the available capacity freed up can be used to generate additional profits from a different product.

(v) Management should consider whether **labour morale** will be adversely affected by a decision to locate production overseas.

(5) Companies and government bodies have increasingly tended to **concentrate on their core competences** – what they are really good at (or set up to achieve) – and turn other functions over to **specialist contractors.** A company that earns its profits from, say, manufacturing bicycles, does not also need to have expertise in, say, mass catering or office cleaning.

Outsourcing is the use of external suppliers for finished products, components or services. This is also known as **contract manufacturing** or **sub-contracting**.

Reasons for this trend include:

(i) Frequently the decision is made on the grounds that **specialist contractors** can offer **superior quality** and **efficiency**. If a contractor's main business is making a specific component it can invest in the specialist machinery and labour and knowledge skills needed to make that component. However, this component may be only one of many needed by the contractor's customer, and the complexity of components is now such that attempting to keep internal facilities up to the standard of specialists detracts from the main business of the customer.

(ii) Contracting out manufacturing **frees capital** that can then be invested in core activities such as market research, product definition, product planning, marketing and sales.

(iii) **Contractors** have the **capacity** and **flexibility** to start production very quickly to meet sudden **variations in demand**. In-house facilities may not be able to respond as quickly, because of the need to redirect resources from elsewhere.

In administrative and support functions, too, companies are increasingly likely to use specialist companies. Decisions such as the following are now common.

(i) Whether the **design and development of a new computer system** should be entrusted to in-house data processing staff or whether an external software house should be hired to do the work.

(ii) Whether **maintenance and repairs** of certain items of equipment should be dealt with by in-house engineers, or whether a maintenance contract should be made with a specialist organisation.

108 Project E

(1) As inflation rates differ for revenue and cost, nominal cash flows (ie including inflation) need to be calculated and discounted at the nominal rate (also including inflation).

	Year 0	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
	Rs. '000	Rs. '000	Rs. '000	Rs. '000	Rs. '000	Rs. '000
Sales (W1)		5,670	6,808	5,788	6,928	
Variable cost (W2)		(3,307)	(4,090)	(3,514)	(4,040)	
Fixed costs (W3)		(776)	(803)	(832)	(861)	
Taxable cash flow		1,587	1,915	1,442	2,027	
Taxation			(444)	(536)	(404)	(568)
Capital expenditure	(5,000)					
Scrap value					400	
Tax benefit of tax depn (W4)			350	350	350	238
	(5,000)	1,587	1,821	1,256	2,373	(330)
Discount factors @ 13%	1	0.885	0.783	0.693	0.613	0.543
Present value	(5,000)	1,405	1,426	870	1,455	(179)

Net present value (in Rs.'000) = -5,000 + 1,405 + 1,426 + 870 + 1,455 – 179 = (23)

The net present value is negative and the investment is not financially worthwhile. However, the board have decided that it is strategically important to undertake this project, and the NPV is only marginally negative.

Workings

1 *Sales*

	Volume	*Price*	*Inflation*	*Revenue*
		Rs.		Rs.
Year 1	12,000 ×	450 ×	1.05	= 5,670,000
Year 2	13,000 ×	475 ×	1.05^2	= 6,807,938
Year 3	10,000 ×	500 ×	1.05^3	= 5,788,125
Year 4	10,000 ×	570 ×	1.05^4	= 6,928,386

2 *Variable costs*

	Volume	*Price*	*Inflation*	*Revenue*
		Rs.		Rs.
Year 1	12,000 ×	260 ×	1.06	= 3,307,200
Year 2	13,000 ×	280 ×	1.06^2	= 4,089,904
Year 3	10,000 ×	295 ×	1.06^3	= 3,513,497
Year 4	10,000 ×	320 ×	1.06^4	= 4,039,926

3 *Fixed costs*

Fixed costs Rs. 750,000 per year inflating at 3.5%

Year		*Fixed costs* (Rs.)
1	750×1.035	776,250
2	750×1.035^2	803,419
3	750×1.035^3	831,538
4	750×1.035^4	860,642

4 *Tax allowable depreciation tax benefits*

Year		*Tax allowable depn* (Rs.)	*Tax benefit @ 28%* (Rs.)
1	5,000,000 × 25%	1,250,000	350,000
2	5,000,000 × 25%	1,250,000	350,000
3	5,000,000 × 25%	1,250,000	350,000
4	Bal allowance	850,000	238,000
Scrap value		400,000	
		5,000,000	

Tax benefits and tax charges affect the following period since tax is paid in arrears.

(2) Sensitivity to sales volume:

Sensitivity % = NPV of project / NPV of affected cashflows.

NPV of cash flows affected by sales volume:

	Year 0 Rs. '000	*Year 1* Rs. '000	*Year 2* Rs. '000	*Year 3* Rs. '000	*Year 4* Rs. '000	*Year 5* Rs. '000
Sales (W1)		5,670	6,808	5,788	6,928	
Variable cost (W2)		(3,307)	(4,090)	(3,514)	(4,040)	
Taxable cash flow		2,363	2,718	2,274	2,888	
Taxation 28%			(662)	(761)	(637)	(809)
		2,363	2,056	1,513	2,251	(809)
Discount factors @ 13%	1	0.885	0.783	0.693	0.613	0.543
Present value	0	2,091	1,610	1049	1,380	(439)

NPV (in Rs. '000) = 2,091 + 1,610 + 1,049 + 1,380 – 439 = 5,691

Therefore sensitivity = 23/5,691 = 0.4% ie a 0.4% increase in sales volume above the estimated levels will yield a positive NPV – very sensitive.

109 SK Plc

(1) (i) **Marginal cost**

With such an approach, variable cost is usually assumed to be equivalent to the marginal cost of the unit being transferred.

Supplying division. A transfer price at marginal cost means that the supplying division does not cover its fixed costs and so makes no contribution on the transfer. The division would therefore have no incentive to provide the service internally.

Receiving division. Provided the variable cost of the service is less than the market price (which it should be if the supplying division is efficient), the receiving division would be keen on such an approach to setting transfer prices.

SK plc. Given that the manager of the supplying division would prefer to transfer externally, head office are likely to have to insist that internal transfers are made.

(ii) **Opportunity cost**

With this approach, the transfer price is set at the standard variable cost per unit in the supplying division plus the opportunity cost to the organisation as a whole of supplying the unit internally instead of externally.

The transfer price will be either the maximum contribution foregone by the supplying division in transferring internally rather than selling externally, or the contribution foregone by not using the same facilities in the supplying division for their next best alternative use.

If there is no external market for the service being transferred and no alternative uses for the supplying division's facilities, the method will give a transfer price of variable (marginal) cost, with its accompanying consequences.

If resources are limited, however:

(1) The **supplying division** will be indifferent between internal and external sales as the transfer price will be market price.

(2) The **receiving division** will be indifferent between purchasing internally and eternally (unless internal transfers are accompanied by a far higher level of service).

(3) The transfer price should ensure that available resources are used in a way which will maximise the benefit to **SK plc** as a whole. An organisational policy will be needed, however, to ensure that internal transfers are accompanied by savings in administration and distribution costs.

(2) **Actual cost versus standard cost**

When a transfer price is based on cost, **standard cost** should be used, not actual cost. A transfer at actual cost would give the supplying division **no incentive** to control costs because all of the costs could be passed on to the receiving division. Actual cost plus transfer prices might even encourage the manager of the supplying division to **overspend**, because this would increase divisional profit, even though the organisation as a whole (and the receiving division) suffers.

Standard cost based transfer prices should encourage the supplying division to become more **efficient** as any variances that arise would affect the results of the supplying division (as opposed to being passed on to the receiving division if actual costs were used).

The problem with the approach, however, is that it **penalises** the **supplying division** if the standard cost is **unattainable**, while it penalises the **receiving** division if it is too **easily attainable**.

110 DE Company

(1) Division E has made internal sales of 70,000 components to Division D at **opportunity cost**. As a result of the transfer, there has been unfulfilled external demand of 42,000 components.

Therefore 42,000 components in the transfer will have been priced at **market value** and the balance of 28,000 will be valued at **variable cost**.

Division E has produced 140,000 components during the year with a total variable cost of Rs. 140 million. Therefore, **variable cost per unit** is Rs. 1,000.

The current **market value selling price** is Rs. 1,550 per unit.

	Internal			
	Variable cost	*Market value*	*External*	*Total*
Components (units)	28,000	42,000	70,000	140,000
	Rs'000	Rs'000	Rs'000	Rs'000
Variable cost	28,000	42,000	70,000	140,000
Sales value	28,000	65,100	108,500	201,600

(2) Division E has sold 28,000 units to Division D **without making any profit on these units**. The market value of these is Rs. 43.4 million which is Rs. 15.4 million higher than the **transfer price** (28,000 units × Rs. 1,000 per unit = Rs. 28.0 million).

Although charging the full market value price may not be appropriate for Division D as the units could not be sold externally, there should be some **reward accruing to Division E** for the supply of the components.

A **transfer price above variable cost** would reduce the profits of Division D and increase the profits of Division E by the same amount. If the transfer price was set at Rs. 1,275 per unit (halfway between the variable cost and the market value) then the profit of each division would change by Rs. 7.7 million.

An **increase in external demand** would mean more components supplied to Division D would be at **market value** which would further increase the profits of Division E and lower the profits of Division D. The opposite effect would occur if there were a decrease in external demand.

(3) (i) **From the perspective of Division E**

There are two effects of this investment, an increase in capacity of 10% and a decrease in variable costs of 20%. From the perspective of the manager of Division E these benefits will be diluted by the current transfer pricing policy.

Increased capacity

External annual demand will continue to be 112,000 components. Division E currently sells 70,000 components externally.

If Division E has **10% higher capacity** then it can increase external sales by this 10%. However, in doing this it will increase the number of goods transferred to Division D at **variable cost** as the opportunity cost of the internal transfer will be lower. Therefore the external sales at **market value** will now be [70,000 + (140,000 × 10%)] = 84,000.

The **internal sales at market value** will be lower (28,000 units) as there are now only 28,000 components of unsatisfied external demand. Therefore there are still 112,000 units sold at market value (see part (1)).

As a result the same number of units (112,000 units – 84,000 units) will be sold at market value as before and the rest will generate no profit to Division E. Therefore there is **no benefit for Division E** from the increased capacity.

Reduction in costs

Looking at the reduction in costs, there will be a cost saving to Division E.

Division E currently sells 50% of its components internally and 28/70 of these are transferred at **variable cost** (see part (1)). Therefore the cost savings on these units will be passed on to Division D as a result of the transfer pricing. The **cost saving** relevant to Division E will be limited to the units sold at **market value**.

The variable cost of the items sold at market value is

112,000 units × Rs. 1,000 = Rs. 112 million

A 20% cost saving would reduce this cost to

Rs. 112 million × 0.80 = Rs. 89.6 million per annum

Over five years, using the five year annuity factor at 8%, this has a present value of

Rs. 22.4 million × 3.993 = Rs. 89.44 million

This is less than the cost of the investment of Rs. 120 million and therefore the investment is **not financially viable** from the perspective of Division E.

(ii) **From the perspective of the DE company**

Evaluating the investment from the company perspective means taking into account the savings that Division D has made on the items transferred from Division E.

The original cost to Division D of these units was the sales value from Division E

Rs. 28 million + Rs. 65.1 million = Rs. 93.1 million (see part (1)).

Because the proportion of market value units has changed as a result of the investment the new cost is as follows

	Rs
42,000 components at variable cost (Rs. 1,000 × 0.80)	33.6 million
28,000 components at market value of Rs. 1,550	43.4 million
	77.0 million

This gives a cost saving to Division D of Rs. 93.1 million – Rs. 77.0 million = Rs. 16.1 million

Added to the savings of Division E this gives total annual savings of

Rs. 22.4 (part (i)) + Rs. 16.1 = Rs. 38.5 million

Over five years, using the five year annuity factor at 8%, this has a present value of

Rs. 38.5 million × 3.993 = Rs. 153.73 million.

Since this exceeds the initial cost of Rs. 120 million the investment **is financially viable** from a company point of view.

111 Special Gift Suppliers Co

(1) Funding requirement = Average inventory holding period
+ Average receivables' collection period
– Average payables' payment period
= 3.5 + 2.5 – 2.0
= 4.0 months

(2) **Existing receivables collection costs**

	Rs
Bad debts (3% × 90% × Rs. 2,500m)	67,500,00
Salary of sales ledger administrator	12,500,000
Cost of financing debts (90% × (2.5/12) × 12% × Rs. 2.5m)	56,250,000
Total cost	136,250,000

Receivables collection costs under factor

	Rs
Cost of advancing funds (90% × 80% × (1/12) × 15% × Rs. 2.5m)	22,500,000
Cost of financing remaining debts (90% × 20% × (1/12) × 12% × Rs. 2.5m)	4,500,000
Charge for factoring services (4% × 90% × Rs. 2.5m)	90,000,000
One-off payment to factor (25,000 × 12%)	3,000,000
Total cost	120,000,000

Hence it is worthwhile to factor the debts.

(3) To: Financial Controller, Special Gift Department
From: Adviser
Subject: Working capital
Date: 27 September 20X2

This report covers a number of aspects of managing working capital.

(i) **Functioning of a credit control department**

The credit control department should be involved with customers at all stages of the credit control cycle.

(1) When customers **first request credit**, the credit control department should **obtain references** and **credit ratings, analyse their accounts** and obtain other information such as **press comment** as appropriate. Staff may also **visit the customer**. A **credit limit** should be recommended based on the information obtained; initially the limit should be **low**, and only raised over time if the **customer's payment record** is good.

(2) When the customer makes an order, the credit control department should check whether the **new order** will cause the customer to **exceed** their limits.

(3) Staff should also **review regularly** the **appropriateness of credit limits**, and **check the aged receivable listing** to see if debts are overdue and **report problems** to **designated senior managers**.

(4) The credit control department will be responsible for issuing documentation such as **monthly statements** and **demands for payment**. Staff should **maintain contacts** with other departments, trying to ensure that orders are not accepted from customers who are in difficulties. The department will **pursue slow payers**, ultimately **employing debt collectors** and **initiating legal action**.

(5) The **department's procedures** should be set out in a **credit control manual**.

(ii) **Benefits of factoring**

(1) The business can **pay** its **suppliers promptly**, and so be able to take advantage of any early payment discounts that are available.

(2) **Optimum inventory levels** can be **maintained**, because the business will have enough cash to pay for the inventories it needs.

(3) **Growth** can be **financed** through **sales** rather than by injecting fresh external capital.

(4) The business gets **finance linked** to its **volume of sales**. In contrast, overdraft limits tend to be determined by historical balance sheets.

(5) The **managers** of the business **do not** have to **spend** their **time** on the problems of **slow paying receivables**.

(6) The business does **not incur** the **costs** of **running** its own **sales ledger department**, and can use the **expertise** of receivable management that the factor has.

(7) Because they are managing a number of sales ledgers, factors can **manage receivables more efficiently** than individual businesses through economies of scale.

(iii) **Financing of working capital**

Types of current assets

(1) The **permanent current assets** businesses hold will include a minimum level of receivables owing money, and minimum balances of inventory and cash held for safety reasons. These minimum levels represent permanent working capital.

(2) **Fluctuating current assets** are assets held over and above the minimum amounts.

Aggressive management

If working capital is managed aggressively, all fluctuating assets plus a certain proportion of permanent current assets will be financed by short-term capital such as bank overdrafts and trade payables. Aggressive management will mean that there is an increased risk of cash flow and liquidity problems. Businesses may also suffer higher interest costs on short-term sources of finance.

Use of long-term capital

If short-term methods cannot be used, long-term funding such as long-term loans or share capital not tied up in funding non-current assets will be used to support working capital. This will mean that working capital is managed conservatively, with all non-current assets and permanent current assets, as well as part of fluctuating current assets, being financed by long-term capital. When fluctuating current assets are low, there will be surplus cash which the company will be able to invest in marketable securities.

Note this answer is longer than would be required in the exam but is provided for tutorial purposes.

112 Velm

(1) Short-term sources of finance include overdrafts and short-term loans. Long-term sources of finance include loan notes and long-term loans. The choice is between cheaper but riskier short-term finance and more expensive but less risky long-term debt. A customer might ask the bank for a short term overdraft facility when the bank would wish to suggest a loan instead; alternatively, a customer might ask for a loan when an overdraft would be more appropriate.

In most cases, when a customer wants finance to help with **'day to day' trading** and cash flow needs, an overdraft would be the appropriate method of financing. The customer should not be short of cash all the time, and should expect to be in credit in some days, but in need of an overdraft on others.

When a customer wants to borrow from a bank for only a short period of time, even for the purchase of a major non-current asset such as an item of plant or machinery, an overdraft facility might be **more suitable** than a loan, because the customer will stop paying interest as soon as his account goes into credit.

However, when a customer wants to borrow from a bank, but cannot see his way to repaying the bank except over the course of a few years, the required financing is best catered for by the provision of a loan rather than an overdraft facility.

Advantages of an overdraft over a loan

(i) The customer **only pays interest when he is overdrawn**.

(ii) The bank has the flexibility to **review** the customer's overdraft facility periodically, and perhaps agree to additional facilities, or insist on a reduction in the facility.

(iii) An overdraft can do the same job as a **loan**: a facility can simply be renewed every time it comes up for review.

(iv) Being short-term debt, an overdraft will not affect the calculation of a company's **gearing**.

Bear in mind, however, that overdrafts are technically **repayable on demand**, so even though they are cheaper than longer term sources of debt finance, they are more risky.

Advantages of a long term loan

(i) Both the customer and the bank know exactly what the repayments of the loan will be and how much interest is payable, and when. This makes planning (budgeting) simpler.

(ii) The customer does not have to worry about the bank deciding to reduce or withdraw an overdraft facility before he is in a position to repay what is owed. There is an element of 'security' or 'peace of mind' in being able to arrange a loan for an agreed term. However, long term finance is generally more expensive than short term finance.

(iii) Loans normally carry a facility letter setting out the precise terms of the agreement.

Working capital policies can be characterised as **conservative**, **moderate** and **aggressive**. A conservative policy would finance working capital needs primarily from long term sources of finance, so all long term assets and some fluctuating current assets. However, Velm Co is following an aggressive financing policy as long term debt only makes up 2.75% (40/1,450) of non-cash current assets and most finance is provided by short term debt (Rs. 1,530million).

(2) As a general rule, assets which yield profits over a long period of time should be financed by long-term funds. This is an application of the **matching principle**.

In this way, the returns made by the asset will be sufficient to pay either the interest cost of the loans raised to buy it, or dividends on its equity funding.

If, however a long-term asset is financed by short-term funds, the company cannot be certain that when the loan becomes repayable, it will have enough cash (from profits) to repay it.

Under a moderate or matching approach, a company would normally finance short-term assets partly with short-term funding and partly with long-term funding. However, Velm appears to be conducting an aggressive financing policy, as short term finance is being used for most of its current assets. This is a higher risk source of finance.

(3) Every business needs adequate **liquid resources** to maintain day-to-day cash flow. It needs enough to pay wages and salaries as they fall due and enough to pay payables if it is to keep its workforce and ensure its supplies.

Maintaining adequate working capital is not just important in the **short term**. Sufficient liquidity must be maintained in order to ensure the **survival of the business** in the long term as well. Even a profitable company may fail if it does not have adequate cash flow to meet its liabilities as they fall due.

On the other hand, an excessively conservative approach to working capital management resulting in **high levels of cash holdings** will harm profits because the opportunity to make a return on the assets tied up as cash will have been missed.

If the turnover periods for inventories and receivables lengthen, or the payment period to payables shortens, then the **operating cycle** will lengthen and the investment in working capital will have to increase. This will increase costs (and decrease shareholder wealth) so it is important that receivables are properly managed and chased up, inventory is maintained at optimum levels (perhaps using the economic order quantity model), and full advantage is taken of suppliers' credit terms.

Since a company must have adequate cash inflows to survive, management should plan and control cash flows as well as profitability. **Cash budgeting** is an important element in short-term cash flow planning. If a budget reveals that a short-term cash shortage can be expected, steps will be taken to meet the problem (perhaps by arranging a bigger bank overdraft facility).

In summary, **working capital management** seeks to improve cash flows by reducing inventories and receivables, taking more credit, or even negotiating a higher bank overdraft facility.

113 PNC

(a) **Customer Profitability Analysis for each customer**

	Customer B	*Customer D*
	Rs'000s	Rs'000s
Factory contribution	75	40.5
Sales visits	6	3
Order processing	7.5	2
Normal deliveries	22.5	7.5
Urgent deliveries	10	0
Allocation of overheads	46	12.5
Profit attributed to customer	**29**	**28**

Workings – Cost driver rates

Activity	*Working*	*Rate*	*B*	*D*
	Rs'000s	Rs	Rs	Rs
Sales visits	50,000 cost / 200 sales visits	250 per visit	24 sales visits × 250 = 6,000	12 sales visits × 250 = 3,000
Order processing	70,000 cost / 700 orders placed	100 per order	75 orders placed × 100 = 7,500	20 orders placed × 100 = 2,000
Normal delivery	120,000 cost / 240 normal deliveries	500 per normal delivery	45 normal deliveries × 500 = 22,500	15 normal deliveries × 500 = 7,500
Urgent deliveries	60,000 cost / 30 urgent deliveries	2,000 per urgent delivery	5 urgent deliveries × 2,000 = 10,000	0 urgent deliveries

(b) **How PNC could use CPA to increase its profits**

Customer profitability analysis (CPA) provides important information which allows an organisation to determine both which classes of customers it should concentrate on and the prices it should charge. CPA applies the principles of activity-based costing to split customer costs into key activities.

PNC could improve profitability by considering how it could alter its internal processes to reduce the costs of the key activities. For example, PNC could no longer offer an urgent delivery service to customers.

The company could also reflect the costs caused by customer behaviour by increasing the sales price of the product to yield greater margins.

114 Fortune Llc

(1) We need to machinery out limiting factor analysis.

Step 1 **Establish machine resources, if any**

We are told that one of the production operations is the bottleneck, limiting production/sales.

Step 2 **Rank products on the basis of contribution per unit of the limiting factor**

	A	*B*
	Rs	Rs
Direct material cost	20	400
Variable production overhead cost	280	40
	300	440
Selling price	600	700
Contribution per unit	300	260
Bottleneck hours per unit	0.02	0.015
Contribution per bottleneck hour	Rs. 15,000	Rs. 17,333
Ranking	**2**	**1**

Step 3 **Determine profit-maximising product mix**

Product	*Demand*		*Hours required*	*Hours available*		*Units of production*
B	45,000 × 1.2 = 54,000	(× 0.015)	810	810	(÷ 0.015)	54,000
A	120,000 × 1.2 = 144,000	(× 0.02)	2,880	2,265 (bal)	(÷ 0.02)	113,250
			3,690	3,075		

Step 4 **Maximum profit calculation**

Product	*Units*	*Contribution per unit*	*Total contribution*
			Rs
A	113,250	× Rs. 300	33,975,000
B	54,000	× Rs. 260	14,040,000
			48,015,000
Less: fixed production overhead			(14,700,000)
Maximum net profit			33,315,000

(2) (i) Throughput return per production hour of the bottleneck resource = (selling price – material cost)/hours on the bottleneck resource

Step 1 **Rank products on the basis of throughput return per bottleneck hour**

	A	*B*
	Rs	Rs
Selling price	600	700
Material cost	20	400
Throughput return	580	300
Bottleneck hours per unit	0.02	0.015
Return per bottleneck hour	Rs. 29,000	Rs. 20,000
Ranking	1	2

Step 2 **Determine profit-maximising product mix**

Product	*Demand*	*Hours Required*	*Hours available*		*Units of production*
A	144,000	2,880	2,880	(÷ 0.02)	144,000
B	54,000	810	195 (bal)	(÷ 0.015)	13,000
		3,690	3,075		

Step 3 **Maximum profit calculation**

Product	*Units*	*Throughput return per unit*	*Total return*	
			Rs	
A	144,000	× Rs. 580	83,520,000	
B	13,000	× Rs. 300	3,900,000	
Total throughput return			87,420,000	
Less: overhead costs				
Variable cost in (1) ((120,000 × Rs. 280) + (45,000 × Rs. 40))				(35,400,000)
Fixed cost				(14,700,000)
Maximum net profit				37,320,000

(ii) TA ratio = throughput return per hour/conversion cost per hour

Conversion cost per hour = overhead costs/bottleneck hours
= Rs.(35,400,000 + 14,700,000)/3,075
= Rs. 16,292.68

∴ TA ratio for B = Rs. 20,000/ Rs. 16,292.68 = 1.2275

(iii) **The meaning of the throughput accounting (TA) ratio**

In a throughput accounting environment, a product is worth producing and selling if its throughput return per time period is greater than the production cost per time period. This can be measured by the throughput accounting (TA) ratio. If the ratio is greater than 1, the return exceeds the cost and the product should be produced.

TA as a control device

Efforts should be made to improve the size of the TA ratio as follows.

(1) Improving throughput (Rs.) per unit by increasing selling price or reducing material cost per unit. Product A has a very high material cost element (Rs. 40).

(2) Improving the throughput return per hour by reducing the time spent on the bottleneck resource. If product A spent 0.012 hours instead of 0.015 hours on the bottleneck resource, say, its TA ratio would improve.

The organisation's overall position can be improved by reducing conversion costs and/or by reducing or eliminating the impact of any bottlenecks.

Product B's TA ratio, at 1.2275, is greater than 1 and so the product is worth producing. Product A's ratio is 1.780 (Rs. 29,000/Rs. 1,6292.68), however, and hence priority should be given to product B.

115 Ace Airline

(a) The following performance indicators could be used to analyse the three airlines:

	Ace Airline	*Beeland*	*Cutprice*
Operating profit margin	630/5,430 11.6%	54/7,350 0.7%	127/2,170 5.9%
Capacity utilisation (load factor)	79,619/100,654 79.1%	82,554/105,974 77.9%	40,973/46,934 87.3%
Revenue/staff member (Rs'000s)	5,430m/32,501 167	7,350m/56,065 131	2,170m/5,372 404
Fuel cost/seat kilometre (Rs'000s)	1,480m/100,654m 0.015	1,823m/105,974m 0.017	535m/46,934m 0.011

Operating margin – Ace has the highest operating margin of the three airlines (11.6%), which suggests it is being run efficiently overall.

We might expect Ace to achieve a relatively high margin because it appears to be pursuing a **differentiation strategy**. However, Beeland, which appears to be pursuing a similar strategy, generates an operating profit margin of less than 1%.

Capacity utilisation – By showing, on average, how full each airline's aircraft are this indicator shows how well the airlines are using their asset base (ie their aircraft).

Ace and Beeland's performance is similar in this respect, but Cutprice's is significantly better. This is likely to be because Cutprice (a low cost airline) is pursuing a **cost leadership** strategy. Ace might consider reducing its prices to try to improve capacity utilisation, but it needs to do so in the context of its overall strategy. If it reduces prices too much, it may end up compromising the quality and service it offers to passengers, but these elements are crucial to its strategy as a differentiator.

Revenue per staff member – This is an important measure in the context of the recent disputes over working conditions and pay. Ace's staff appear to be performing better than Beeland's, which in turn might strengthen their claims for a pay rise.

The comparison between Ace and Cutprice's performance for this measure may be less meaningful. Cutprice **outsources** many of its activities, meaning its staff numbers will be significantly lower than Ace which machineries out the corresponding activities **in house**.

Fuel costs – The board's interest in new fuel-efficient aircraft indicates that reducing fuel costs is an important concern for Ace.

Again, Cutprice appears to be controlling its fuel costs better than Ace or Beeland. This might be because it has more **fuel-efficient planes**, which would support the board's argument for Ace investing in new aircraft. However, Cutprice may have negotiated more favourable fuel contracts with its suppliers, or be using lower grade fuel.

Note: It is important to use fuel cost per **seat** kilometre as the performance indicator here rather than fuel cost per **passenger** kilometre, because we are looking to monitor the fuel efficiency of the aircraft, rather than the airline's ability to fill their aircraft with passengers.

(b) Ace's business strategy as a premium airline, coupled with the difficult trading conditions, mean that it is increasingly important for the company to provide its customers with the best services and experiences possible, so that they choose to fly with Ace in preference to another machinerier. Increasing the data it holds about customers, and potential customers, should help Ace's management make better decisions, and thereby should help the company achieve this.

Detecting key trends – Analysing conversations on social media could help Ace identify potential trends in customer demand; for example, if there are major events taking place in a particular place, or if certain resorts are increasing (or decreasing) in popularity as holiday destinations. Being able to forecast demand more accurately – and almost in 'real time' – could help

Ace boost revenue, through applying **dynamic pricing**. For example, Ace could keep prices high on flights which are going to be popular, but could reduce prices on flights which look like they are going to have a lower capacity utilisation in order to try to boost demand for those flights.

Customer selection process – One of the key issues here is for airlines to understand the reason why potential customers have not completed their transaction – for example, this could be due to price, seat availability, difficulties in the booking process itself. In this respect, if Ace was able to capture data about the stage in the booking process which causes potential customers to abandon their booking, it could then look at ways to tackle the problem – for example, if there was a confusing user interface on the Ace website this could be amended to make booking easier. Equally, applying the 'velocity' aspect of Big Data, if a customer abandons a transaction, and Ace already has their contact details, the customer could immediately be sent an incentive to try to encourage them to complete the purchase.

In-flight sales – Ace currently offers a standard selection of in-flight products across all its flights. However, the amount of products Ace sells (and therefore the amount of in-flight revenue ancillary revenue Ace generates) is likely to depend on how well the products offered meet customer needs. By analysing the purchasing patterns of different passengers (or different types of passengers) on different routes, Ace could customise the range of products it offers on different flights, to focus on the products which are most likely to appeal to the passengers on a particular flight.

Customer satisfaction – In the same way that conversations on social media could help to identify trends in demand, they could also help to indicate how satisfied customers are (or aren't) with their flights and the service they receive from Ace. However, although knowing whether customers are satisfied or not is useful, perhaps the greater value will come from identifying any factors which are reducing satisfaction levels so that Ace can then address the causes of any problems and take steps to improve its performance in those areas.

(c) Big Data is typically characterised by a range of 'V' characteristics – volume, variety, velocity and veracity.

Capacity – The potential benefits to Ace of Big Data will come from the useful information it can extract from large amounts of data. However, the 'volume' and the 'variety' of the data could also require increased information systems capacity in order to capture and store the data correctly. If the data is not stored correctly, this will undermine its veracity – its integrity and reliability as a basis for making decisions.

The fact that a number of IT staff are already working on the website upgrade project could be a problem here, if it means that there aren't sufficient staff available to increase the information system capacity to the degree required for Big Data.

Analytical tools – As well as having the capacity to store Big Data, Ace will need the right analytical tools and technologies to be able to analyse it, because it is too large and unstructured to be analysed through traditional means. Again, the lack of available IT staff could present problems here.

Data overload – A more general concern to beware of is the difference between data and information. Management decisions need to be based on relevant information, not raw data. Therefore, by itself, increasing the volume of data available to Ace would not necessarily provide managers with better information for decision making. Here again, Ace would need analysts with the experience and expertise to be able to extract meaning from the captured data, but it seems unlikely that Ace has any such staff currently available.

Similarly, if the volume and variety of the data means that Ace's current information systems are not able to process it, the 'velocity' aspect of Big Data will be undermined. If IT teams or business analysts become burdened with increasing requests for ad hoc analysis and one-off reports (because the systems cannot process the data automatically), the information and analysis from Big Data will not be available for decision makers as quickly as they might want.

116 Expanse Llc

(1) (i) No capital rationing, so choose all projects with a positive NPV, ie:

	NPV
	Rs'000
A	577
D	2,856
E	1,664
Total	5,097

(ii) Capital rationing of Rs. 8m on 31/5/X9 (t_0). Rank according to NPV/Rs invested:

	A	*B*	*C*	*D*	*E*
	Rs'000	Rs'000	Rs'000	Rs'000	Rs'000
NPV (Rs'000)	577	(1,309)	(632)	2,856	1,664
Investment t_0	4,150	3,870	6,400	5,000	4,600
NPV/Rs	0.139	n/a	n/a	0.571	0.362
Rank	3			1	2

Therefore choose all of D (Rs. 5m investment) and 65.2% (Rs. 3,000/Rs. 4,600) of E:

	NPV Rs'000
D (100%)	2,856
E (65.2%)	1,085
Total	3,941

(iii) No capital rationing at t_0 but only Rs. 500,000 available at t_1:

A	Positive NPV and negative funds in t_1	So consider further
B	Negative NPV and negative funds in t_1	So ignore
C	Negative NPV but positive funds in t_1	So consider further
D	Positive NPV and negative funds in t_1	So consider further
E	Positive NPV and positive funds in t_1	So accept unconditionally

If C is ignored, because it has a negative NPV, then there is Rs. 1,790,000 (Rs. 500,000 + 1,290,000 [E]) available at t_1.

Thus choose D and do 68.6% (Rs. 1,790,000/Rs. 2,610,000) of it. Therefore, the total NPV would be:

	NPV Rs'000
Project E	1,664
Project D (68.6% × Rs. 2,856,000)	1,959
	3,623

Alternatively, if C is considered and its positive t_1 cash flow utilised then there is Rs. 3,560,000 capital available (Rs. 1,790,000 + Rs. 1,770,000) at t_1.

Based on the same ranking, for t_1 choose 100% D and use the balance (Rs. 950,000) to fund A, ie (higher ranking than A) and do 73.6% (Rs. 950,000/Rs. 1,290,000) of it. Thus the total NPV would be:

	NPV Rs'000
E	1,664
D (100%)	2,856
A (73.6% × Rs. 577,000)	425
C	(632)
	4,313

Thus it is preferable if the C project is taken on as this produces a higher total NPV, despite C being negative, as it allows investment in a greater proportion of positive NPV projects.

(2) Calculation of NPVs of each potential replacement cycle:

1 year cycle:

(110,000) + (70,000 × 0.909) + ((66,000) × 0.909) = Rs.(106,360)

2 year cycle:

(110,000) + (42,000 × 0.826) + ((66,000) × 0.909) + ((76,000) × 0.826) = Rs.(198,080)

3 year cycle:

(110,000) + (18,000 × 0.751) + ((66,000) × 0.909) + ((76,000) × 0.826) + ((92,000) × 0.751) = Rs.(288,340)

The annual equivalent costs are:

1 year cycle: (106,360)/0.909 = Rs.(117,010)

2 year cycle: (198,080)/1.736 = Rs.(114,100) **- lowest**

3 year cycle: (288,340)/2.487 = Rs.(115,940)

Therefore the advice to Expanse Llc is to replace the new machines after two years. Before the decision is made, the directors are advised to consider other non-financial factors such as practically of maintaining machinery in later years and financial considerations, such as lost output due to breakdown.

117 TickTock Llc

(1) Process Alpha

Year	*Cash flow (Rs'000)*	*Discount factor 13%*	*PV (Rs'000)*	*Discount factor 20%*	*PV (Rs'000)*
0	(3,800)	1.000	(3,800)	1.000	(3,800)
1	1,220	0.885	1,080	0.833	1,016
2	1,153	0.783	903	0.694	800
3	1,386	0.693	960	0.578	801
4	3,829	0.613	2,347	0.482	1,846
			1,490		663

IRR is approximately 13% + (1,490/(1,490 – 663)) × (20% – 13%) = 25.6%

MIRR

Year	*Cash flow* (Rs'000s)	*Multiplier*	*Rs-invested amount* (Rs'000s)
1	1,220	1.1275^3	1,749
2	1,153	1.1275^2	1,466
3	1,386	1.1275	1,563
4	3,829	1.0000	3,829
			8,607

Note. It would be acceptable to compound using a WACC that is rounded up to 13%.

MIRR = $(8,607/3,800)^{1/4}$ -1 = 22.7%

Internal rate of return (IRR) assumes that positive cash flows are reinvested at the IRR. The modified internal rate of return (MIRR) assumes that positive cash flows are reinvested at the cost of capital. The assumption is more reasonable and the result produced is consistent with the net present value. Process Beta should be adopted as a result, although the difference between the two projects is not significant.

(2) A 99% confidence level requires the value at risk to be within 2.33 standard deviations from the mean, based on a single tail measure.

Annual VAR = 2.33 × Rs. 800,000 = Rs. 1,864,000
Five year VAR = Rs. 1,864,000 × $5^{0.5}$ = Rs. 4,168,031

This means that TicTock can be confident 99% confident that the cash flows will not fall by more than Rs. 1,864,000 in any one year or Rs. 4,168,031 in total over the five year period.

This means that it can be 99% sure that the returns will be at least (Rs. 2,200,000 – Rs. 1,864,000) = Rs. 336,000 each year.

The company can also be 99% sure that the total five-year returns (5 × Rs. 2,200,000) will be at least (Rs. 11,000,000 – Rs. 4,168,031) = Rs. 6,831,969.

Therefore, there is only a 1% chance that the returns will be less than Rs. 336,000 each year or Rs. 6,831,969 in total.

(3) Simulations (such as Monte Carlo simulation) can be used to estimate the volatility of the project's NPV. Such techniques amount to adopting a particular probability distribution for the uncertain (random) variables – such as cash surpluses – and then using simulations to generate values of these variables.

In this particular project, the decommissioning costs are not considered to be a random variable, but rather a variable with a limit value and a most likely value.

The simulation is performed in the first instance to obtain a 'trial value' but is then repeated thousands of times for the variables of interest to derive the NPV for each possible simulated outcome. A distribution of NPVs is then obtained which should estimate a normal distribution. This can be used to estimate project volatility.

The output from a simulation will give the expected NPV and other such statistics as the standard deviation of the output distribution. The output can also rank the variables in order of significance in determining the NPV of the project.

(4) Risk is most commonly dealt with by using expected value analysis, which involves assigning probabilities to all possible outcomes. The major drawback is that the assignment of probabilities is highly subjective. This method is also not suitable for a one-off project, as it may give an expected value that is not possible. It also does not indicate the maximum loss or the probability or making a loss, factors which will impact managers' decision-making when they consider project risks.

Uncertainty can be dealt with using a variety of methods. One of these is sensitivity analysis. This involves altering the variables in the investment appraisal and seeing how this affects the outcome. The main drawbacks are that variables are looked at in isolation, but in reality they may be interdependent and that it does not assess the likelihood of the changes in the variables occurring.

Payback and discounted payback can be used to determine how long it will take to recover the initial cost of the investment. The major drawback is that any cash flows after payback has occurred are ignored.

(5) **Likelihood Low Consequences Low**

Accept risks. The costs of taking measures to avoid or reduce these risks will outweigh the benefits.

Likelihood Low Consequences High

Transfer, spread or share risks. Risks may be transferred to a customer by a purchase agreement or shared with a partner in a joint venture. The organisation may take out insurance against the consequences of risks materialising. Adopting a portfolio approach means taking action according to how risks are spread over the whole organisation.

Likelihood High Consequences Low

Reduce risks. Measures should be taken to control these risks, with the aims of:

- Reducing the chances that the risks materialise (for example obtaining reference for all new credit customers).
- Reducing the financial consequences (for example setting a maximum credit limit for customers).

Likelihood High Consequences High

Avoid risks. This can include abandoning business activities, for example ceasing to operate in countries with severe political instability. It can also mean not undertaking certain activities at all, for example using derivatives for speculative purposes.

118 ABC Llc

(1)

	W *Per service* Rs'000	*W* *Total* Rs'000	*X* *Per service* Rs'000	*X* *Total* Rs'000	*Y* *Per service* Rs'000	*Y* *Total* Rs'000	*Z* *Per service* Rs'000	*Z* *Total* Rs'000	*Total* *Overall* Rs'000
Service units		1,000		2,300		1,450		1,970	
Selling price	18		16		12		20		
Variable cost	8		10		13	*	13		
Gross contribution	10	10,000	6	13,800	(1)	(1,450)	7	13,790	36,140
Attributable fixed costs		4,400		3,700		–		2,650	10,750
Net contribution		**5,600**		**10,100**		**(1,450)**		**11,140**	**25,390**
General fixed costs (see working)									(8,930)
Profit									**16,460**

Working

Total fixed costs = (1,000 × 2) + (2,300 × 3) + (1,450 × 2) + (1,970 × 4) = Rs'000s 19,680

General fixed costs = Rs'000s (19,680 – 4,400 – 3,700 – 2,650) = Rs'000s 8,930

The above table shows that services W, X and Z are financially viable as they make a positive contribution towards the organisation's general fixed costs. Each unit of service Y provided results in a negative contribution, however, and hence the service should not be offered unless there are other business reasons for continuing to provide it, such as the three-year contract for Product Y already in place, as there is a contractual commitment to deliver this.

(2) The contract for the 500 units of product Y should be fulfilled to avoid the significant financial penalties that ABC Llc would incur if it were to break the terms.

This level of provision is below the budgeted number of 1,450 service units and so leaves spare resources that can be employed in the provision of additional units of the other three services if there is demand for them.

Insufficient data has been provided to determine how these spare resources should be used, however, and so they have not been taken into account in the budget profit statement below.

Therefore, the operating plan is Product W: 1,000 units, Product X 2,300 units, Product Y 500 units and Product Z 1,970 units.

(3) We can calculate the breakeven point using the average C/S ratio. We assume that one 'mix' of products is sold which includes 500 units of Y.

Total sales revenue = (1,000 × 18) + (2,300 × 16) + (500 × 12) + (1,970 × 20) = Rs'000s 100,200

Total gross contribution = Total gross contribution from profit statement

Rs'000s 36,140 (includes 1,450 units of Project Y)

Add back (1,450 units – 500 units) × 1 = 950 units (remove the contribution from 950 units of Product Y)

Rs'000s 36,140 + 950 = Rs'000s 37,090

Average C/S ratio = $\frac{37,090}{100,200} \times 100\% = 37\%$

Breakeven point in sales revenue = Fixed costs/contribution to sales ratio = (10,750+ 8,930)/0.37 = Rs'000s 53,189

(4) Although breakeven analysis can give firms an indication of the minimum sales revenue or sales units that are required to cover total costs, it is based on a number of assumptions that really form the basis for its limitations. It is assumed that units are sold in a constant mix which is unlikely to be the case in reality. The proportions in which products are sold vary according to such factors as changing consumer tastes, availability of substitute products, changes in prices and so on

Selling price is assumed to remain constant regardless of the number of units sold. This is unrealistic for most 'normal' products as consumers are often only persuaded to purchase more if prices are reduced. As soon as selling prices change, the breakeven point will change, which makes it necessary to conduct the analysis again.

Inventory levels are ignored as it is assumed that production and sales are the same. Although firms are increasingly striving to machinery less inventory, it is unlikely that production and sales will exactly match.

The analysis suggests that any activity level above the breakeven point will result in profits being made. This is not necessarily the case in reality, as changes in costs and revenues as more units are sold may result in a second breakeven point after which losses may be made. This is particularly true of electronic products such as computer games that have a very short shelf life.

Costs are expected to behave in a linear fashion. Unit variable costs are expected to remain constant regardless of activity levels and fixed costs are not expected to change. This assumption ignores the possibility of economies of scale that could result in lower unit variable costs, or the fact that fixed costs may have to increase after a certain level of activity due to, for example, the need to rent additional premises.

119 Bandara Ltd

OPTION A Varying workforce

	September	*October*	*November*
Production requirement			
Demand	3000	4000	1500
Cl Stock requirement	400	150	150
Op Stock available	300	400	400
Production requirement	3100	3750	1950

Labour requirement

	September	*October*	*November*
Production requirement	3100	3750	1950
Labour hours requirement	3100	3750	1950
Std hours required	3100	3250	1950
Overtime required	-	500	-

Costs	*September*	*October*	*November*	*TOTAL*
Number of standard Labour hours	3100	3250	1950	
Cost of Standard Labour hours	620,000	650,000	390,000	1,660,000
Hours of Overtime	-	500	-	
Cost of Overtime	-	150,000	-	150,000
Total Cost	620,000	900,000	390,000	1,910,000

OPTION B Changing the stock level

	September	*October*	*November*
Available labour hours	3250	3250	3250
Production Quantity	3250	3250	3250
Opening Stock	300	550	0
Actual production	3250	3250	3250
Demand	3000	4000	1500
Closing stock	550	(200)	1750

Costs	*September*	*October*	*November*	*Total*
Labour costs	650,000	650,000	650,000	1950,000
Stock holding costs	8,250	-	26,250	34,500
Stock out costs	-	4,000	-	4,000
TOTAL	658,250	654,000	676,250	1,988,500

It is recommended to follow option B; use of overtime as it is the lower cost option.

120 Robust Laptops

(1) Evaluation of the current method of costing against an ABC system

The costing system is important at RL because it is not only a method of reporting activities in the business, but it also sets the prices that customers pay, and therefore it affects competitiveness.

The traditional system of absorption costing allocates overhead costs to products based on production activity (labour hours in RL's case). Absorption costing suits traditional production environments with few activities and fairly low overheads.

ABC is an alternative method for allocating overheads, intended to reflect the different activities that lead to costs being incurred. The principle benefits of ABC is that identifying and monitoring cost-generating activities leads to more accurate cost control. As such, ABC may be a more appropriate method of allocating overheads than absorption costing when overheads form a large proportion of an organisation's costs.

At RL, overheads comprise 23% of the total costs, meaning they overheads are a significant proportion of the total, although they are not dominant. ABC is most often used in manufacturing where production is typified by small batches and where there is significant tailoring of products to meet customer specifications. This is the case at RL.

We can use order 11784 to assess the impact of introducing ABC. Under the current absorption costing system, the cost per unit would be Rs. 2,556,000 and the price would be Rs. 3,706,000 as there is a mark up of 45%. Under an ABC system, the units would be costed at Rs. 3,194,000 and the mark-up would mean the price is Rs. 4,631,000. This represents an increase of 25% on the current figures. The overhead allocated to the order by the traditional absorption costing method is Rs. 596,000, while ABC allocates Rs. 1,234,000 per unit sold on the order.

Absorption costing cost and price per unit	*Current method st'd costing '000 Rs*	*ABC cost and price per unit '000 Rs*	*Difference '000 Rs*	*%*
Costs		*Costs*		
Direct	1,959.96	1,960.00		
Overhead allocated (14,190,000,000/(23,800,000 × 3)	596.22			
Customer service		593.28		
Purchasing and receiving		458.13		
Stock management		75.86		
Administration of production	–	106.60		
Total cost	**2,556.18**	**3,193.87**		
Mark-up (45%)	1,150.28	1,437.24		
Price	**3,706.46**	**4,631.11**	924.65	24.9

	Total of cost activity	*No of driver units*	*Cost per driver unit*
	Rs m		Rs '000
No of minutes on call to customer	7,735	899,600	8.60
No of purchase orders raised	2,451	21,400	114.53
No of components used in production	1,467	618,800	2.37
Administration of production (absorbed as general overhead)	2,537	71,400	35.53

	Driver units on order	*Cost allocated to order*	*Cost per unit on order (16 orders)*
		Rs '000	Rs '000
No of minutes on call to customer	1,104	9,492	593.28
No of purchase orders raised	64	7,330	458.19
No of components used in production	512	1,214	75.86
Administration of production (absorbed as general overhead)	48	1,706	106.60
			1233.93

This difference in costs indicates that there is currently a significant under-pricing of the order. ABC has identified that the major components of the overhead are the time spent discussing the order, and the number of purchase orders that subsequently have to be raised. RL's management should review these two areas of activity to see if they can be made more efficient. If not, then management need to consider whether orders such as this should be repriced.

However, before increasing the price, RL's management need to assess the impact that any increase in price will have on customers and RL's competitive position. It seems unlikely that customers will accept a 25% increase in price, which is what the calculations are suggesting should be the case.

A change to an ABC system may be warranted as an ABC system would provide valuable extra costing data particularly on product costs and prices that could assist in profitability. However, ABC systems can be time consuming, in terms of collecting the volume of data needed and the systems needed to support this. So a cost-benefit analysis would need to be done between the additional costs of putting in such a system and the extra value of the data produced.

(2) **Activity based management (ABM)** is an approach to management that aims to improve profitability by reviewing the activities of the business. Actions based on activity driver analysis that increase efficiency, lower costs and improve asset utilisation.

Robust Laptops may use Activity Based Management at an operational level, and use activity driver analysis for day to day management for example to increase efficiency, lower costs and improve asset utilisation.

Robust Laptops may also use Strategic Activity Based Management and use activity driver analysis for the 'big picture', for example it may aim to change the demand for activities so as to improve profitability.

Activity Based Management will be able to provide the management of Robust Laptop information on why costs are incurred and on the output of the activity in terms of the cost drivers such as minutes on call to a customer. By controlling or reducing the incidence of the cost driver, the associated cost can also be controlled or reduced.

The extent to which activity based approaches can be applied is very dependent on Robust Laptops ability to identify its main activities and their associated cost drivers.

Mock Exam

THE INSTITUTE OF
CHARTERED ACCOUNTANTS OF SRI LANKA

SECTION A

1 The following statements have been made about traditional absorption costing and activity based costing (ABC).

(1) Traditional absorption costing may be used to set prices for products, but activity based costing cannot.

(2) Traditional absorption costing tends to allocate too many overhead costs to low-volume products and not enough overheads to high-volume products.

(3) Implementing ABC is expensive and time consuming

Which of the above statements is/are true?

- ○ 1 only
- ○ 2 only
- ○ 3 only
- ○ 1 and 2

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2 If Jola Publishing Llc decides to introduce an ABC costing system, which of the following is an advantage of ABC that they can expect to benefit from?

- ○ A reduction in overhead costs
- ○ Cost savings compared to absorption costing
- ○ Simplification of the costing process
- ○ More accurate costs per unit

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3 H Co uses a marginal cost plus pricing system to determine the selling price for one of its products, Product X.

Product X has the following costs:

	Rs'000
Direct materials	12
Direct labour	5
Variable overheads	3
Fixed overheads	40

Fixed overheads are Rs. 20,000,000 for the year. Budgeted output and sales for the year are 500 units and this should be sufficient for Product X to break even.

What profit mark-up would H Co need to add to the marginal cost to allow H Co to break even?

[ ] %

---

4 Indicate, by selecting the relevant boxes in the table below, whether each of the following statements about a business's decision to quote for a contract are true or false?

The opportunity cost is defined as the relevant cost of taking the contract.	**TRUE**	**FALSE**
The decision to quote for a contract should be taken purely on the basis of whether it improves profit or reduces costs for the business.	**TRUE**	**FALSE**

5 The following information is given about standard and actual material costs during one month for a production process.

Material	*Standard cost* per kg	*Actual cost* per kg	*Standard mix*	*Actual mix* Kg
P	300	350	10%	820
Q	250	275	20%	1,740
R	400	350	30%	2,300
S	525	500	40%	2,640
				7,500

What was the favourable materials mix variance?

Rs. [ ]

6 The following statements have been made about the application of standard costing systems.

(1) Standard costing systems are compatible with a Total Quality Management approach to operations.

(2) Standard costing systems are less commonly used in an industry that operates in a rapidly changing environment.

Which of the above statements is/are true?

- ○ 1 only
- ○ 2 only
- ○ Neither 1 nor 2
- ○ Both 1 and 2

7 Which **TWO** of the following statements are true in the context of a just in time (JIT) inventory system?

- ☐ It can result in much reduced inventory holding costs
- ☐ It inevitably increases the need for safety inventories
- ☐ It requires suppliers to operate sound quality control procedures
- ☐ It works best if supplies are obtained from a number of different suppliers

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8 The first item of a new product took 2,000 hours to manufacture (at a labour cost of Rs. 15,000 per hour). A 90% learning curve was expected to apply, and it was decided to establish a standard time as the time required to manufacture the 50th item of the product, rounded to the nearest hour. The 50th item actually took 980 hours.

Select two boxes to indicate the labour efficiency variance for the 50th unit produced and whether it is favourable or adverse.

Value (Rs '000)	*Sign*
645	Favourable
43	Adverse
1,860	
1,905	

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9 A budget that is continuously updated by adding a further accounting period (a month or quarter) when the earlier accounting period has expired is known as which of the following?

Select... ▼
Flexible budget
Periodic budget
Rolling budget
Zero-based budget

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10 A company that uses a balanced scorecard approach to performance measurement has recorded the following data for the previous financial year.

	Products made and sold for at least 2 years	*Products introduced to market within the previous two years = 'new products'*	*Total*
Number of products	16	4	
Annual sales	Rs. 3.0 m	Rs. 0.50 m	Rs. 3.50 m
Cost of sales	Rs. 2.4 m	Rs. 0.42 m	Rs. 2.82 m
Hours worked	27,500	4,500	
Research and development costs			Rs. 150,000

Which of the following would be the most suitable measure of performance from the innovation and learning perspective in a balanced scorecard?

- ○ Development cost per new product
- ○ Sales revenue per new product
- ○ Sales revenue from new products as a percentage of total revenue
- ○ Sales revenue per hour worked on new products

SECTION B

11 Labour

The following details show the direct labour requirements for the first six batches of a new product that were manufactured last month:

	Budget	*Actual*
Output (batches)	6	6
Labour hours	2,400	1,950
Total labour cost	Rs. 168,000	Rs. 136,500

The management accountant reported the following variances:

Total labour cost variance	Rs. 31,500 favourable
Labour rate variance	Nil
Labour efficiency variance	Rs. 31,500 favourable

The Production Manager has now said that he forgot to inform the management accountant that he expected a 90% learning curve to apply for at least the first ten batches.

Required

(1) **Calculate** planning and operational variances that analyse the actual performance taking account of the anticipated learning effect. **(6 marks)**

Note. The learning index for a 90% learning curve is –0.1520.

(2) **Explain** the differences between standard costing and target costing. **(4 marks)**

(LO 2.1.4, 1.2.5, 1.2.2) **(Total = 10 marks)**

12 Z

Z is one of a number of companies that produce three products for an external market. The three products, R, S and T may be bought or sold in this market.

The common process account of Z for March 20X7 is shown below:

	Kg	Rs'000		*Kg*	Rs '000
Inputs					
Material A	1,000	35,000	Normal loss	500	0
Material B	2,000	20,000	Outputs:		
Material C	1,500	30,000	Product R	800	35,000
Direct labour		60,000	Product S	2,000	87,500
Variable overhead		20,000	Product T	1,200	52,500
Fixed cost		10,000			
Totals	4,500	175,000		4,500	175,000

Z can sell products R, S or T after this common process or they can be individually further processed and sold as RZ, SZ and TZ respectively. The market prices for the products at the intermediate stage and after further processing are:

Market prices per kg:

	Rs'000
R	30
S	50
T	35
RZ	60
SZ	57.5
TZ	67.5

The specific costs of the three individual further processes are:

Process R to RZ	variable cost of Rs. 14,000 per kg, no fixed costs
Process S to SZ	variable cost of Rs. 9,000 per kg, no fixed costs
Process T to TZ	variable cost of Rs. 10,000 per kg, fixed cost of Rs. 6 million per month

Required

(1) **Calculate** whether any of the intermediate products should be further processed before being sold. Clearly state your recommendations together with any relevant assumptions that you have made. **(3 marks)**

(2) **Calculate** the viability of the common process:

(i) Assuming that there is an external market for products R,S and T

(ii) Assuming that there is **not** an external market for products R,S and T. State clearly your recommendations **(7 marks)**

(LO 3.2.1) **(Total = 10 marks)**

13 Brace LLC

Brace Co is split into two divisions, A and B, each with their own cost and revenue streams. Each of the divisions is managed by a divisional manager who has the power to make all investment decisions within the division. The cost of capital for both divisions is 12%. Historically, investment decisions have been made by calculating the return on investment (ROI) of any opportunities and at present, the return on investment of each division is 16%.

A new manager who has recently been appointed in division A has argued that using residual income (RI) to make investment decisions would result in 'better goal congruence' throughout the company.

Each division is currently considering the following separate investments:

	Project for Division A	*Project for Division B*
Capital required for investment	Rs. 82.8 million	Rs. 40.6 million
Sales generated by investment	Rs. 44.6 million	Rs. 21.8 million
Net profit margin	28%	33%

The company is seeking to maximise shareholder wealth.

Required

Calculate both the return on investment and residual income of the new investment for each of the two divisions. Comment on these results, taking into consideration the manager's views about residual income.

(LO 2.4.1, 2.4.2) (**10 marks)**

14 DH

DH raised cash through an equity share issue to pay for a new factory it planned to construct. However, the factory contract has been delayed and payments are not expected to be required for three or four months. DH is going to invest its surplus funds until they are required.

One of the directors of DH has identified three possible investment opportunities:

(i) Treasury bills issued by the central bank of DH's country. They could be purchased on 1 December 20X6 for a period of 91 days. The likely purchase price is Rs. 990 per Rs. 1,000.

(ii) Equities quoted on DH's local stock exchange. The stock exchange has had a good record in recent months with the equity index increasing in value for 14 consecutive months. The director recommends that DH invests in three large multinational entities each paying an annual dividend that provides an annual yield of 10% on the current share price.

(iii) DH's bank would pay 3.5% per year on money placed in a deposit account with 30 days' notice.

Required

Prepare notes on the risk and yield of each of the above investment opportunities for use by the management accountant at the next board meeting.

(LO 5.4.3) **(10 marks)**

SECTION C

15 Budgetary control

Required

(1) **Outline** the advantages and disadvantages of allowing profit centre managers to participate actively in the setting of the budget for their units.

(6 marks)

(2) A general insurance company is about to implement a balanced scorecard. You are required to:

(i) **State** the four perspectives of a balanced scorecard.

(ii) **Assess** one recommended performance measure that would be appropriate for a general insurance company, for each of the four perspectives, and give a reason to support each measure. (You must recommend one measure only for each perspective.) **(8 marks)**

(3) Briefly **discuss** three different circumstances where participation in setting budgets is likely to contribute to poor performance from managers.

(6 marks)

(LO 2.3.1, 2.3.2, 2.6.1) **(Total = 20 marks)**

16 Electrical appliances

A manufacturer of electrical appliances is continually reviewing its product range and enhancing its existing products by developing new models to satisfy the demands of its customers. The company intends to always have products at each stage of the product life cycle to ensure the company's continued presence in the market.

Currently the company is reviewing three products:

Product K was introduced to the market some time ago and is now about to enter the maturity stage of its life cycle. The maturity stage is expected to last for ten weeks. Each unit has a variable cost of Rs. 38 and takes one standard hour to produce.

The Managing Director is unsure which of four possible prices the company should charge during the next ten weeks. The following table shows the results of some market research into the level of weekly demand at alternative prices:

Selling price per unit	Rs. 100,000	Rs. 85,000	Rs. 80,000	Rs. 75,000
Weekly demand (units)	600	800	1,200	1,400

Product L was introduced to the market two months ago using a penetration pricing policy and is now about to enter its growth stage. This stage is expected to last for 20 weeks. Each unit has a variable cost of Rs. 45,000 and takes 1.25 standard hours to produce. Market research has indicated that there is a linear relationship between its selling price and the number of units demanded, of the form P = a – bx. At a selling price of Rs. 100,000 per unit demand is expected to be 1,000 units per week. For every Rs. 10,000 increase in selling price the weekly demand will reduce by 200 units and for every Rs. 10,000 decrease in selling price the weekly demand will increase by 200 units.

Product M is currently being tested and is to be launched in ten weeks' time. This is an innovative product which the company believes will change the entire market. The company has decided to use a market skimming approach to pricing this product during its introduction stage.

The company currently has a production facility which has a capacity of 2,000 standard hours per week. This facility is being expanded but the extra capacity will not be available for ten weeks.

Required

(1) (i) **Calculate** which of the four selling prices should be charged for product K, in order to maximise its contribution during its maturity stage. **(3 marks)**

(ii) In order to utilise all of the spare capacity from your answer to (i) above, **calculate** the selling price of product L during its growth stage. **(6 marks)**

(2) **Explain** the similarities and differences between penetration and skimming pricing strategies during the introduction stage, using product M to illustrate your answer. **(6 marks)**

(3) **Explain** with reasons, for each of the remaining stages of M's product life cycle, the changes that would be expected in the average unit production cost. **(5 marks)**

(LO 1.2.3, 3.4.5) **(Total = 20 marks)**

Mock Exam Answers

THE INSTITUTE OF
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SECTION A

1 The correct answer is: 3 only

ABC can be used for cost-plus pricing. Traditional absorption costing tends to allocate insufficient overhead costs to low-volume products that use up a disproportionate amount of time for order handling, production runs and set-ups. ABC is expensive and time-consuming to implement. It is therefore important to assess whether the benefits will outweigh the costs before implementing ABC.

2 The correct answer is: More accurate costs per unit.

Distracters:

- There will not be a reduction in overhead costs as a result of the adoption of ABC. However, management of Jola Publishing Llc may benefit from improved decision making regarding cost control, if they understand the cost drivers better.
- ABC tends to be a more expensive approach to absorption costing.
- ABC is a more complex form of costing.

3 The correct answer is: 200%

Breakeven point = Rs. 20,000,000 = 500 × (selling price – Rs. 20,000)
Rs. 20,000,000/500 = Rs. 40,000
Rs. 40,000 = selling price – Rs. 20,000
Rs. 60,000 = selling price
Profit mark up on marginal cost = (Rs. 60,000 – Rs. 20,000) / Rs. 20,000 × 100% = 200%

Note. Fixed overheads (Rs. 40,000) are omitted, as only marginal costs are included in the calculation of the profit or 'contribution' to the recovery in the fixed costs of Rs. 20,000,000.

4 The correct answer is: Both statements are false

An opportunity cost is the benefit forgone taking one course of action instead of the next most profitable course of action.

The effect that the decision to accept a contract has on profit or cost is an important factor in decision making, but non-financial factors should also be taken into consideration.

5 The correct answer is: Rs. 88,000

	Actual mix	*Standard mix*	*Mix variance*	*Std price*	*Mix variance*
	kg	kg	kg	Rs	Rs
P	820	750	70 (A)	300	21,000 (A)
Q	1,740	1,500	240 (A)	250	60,000 (A)
R	2,300	2,250	50 (A)	400	20,000 (A)
S	2,64000	300,000	360 (F)	5.25	189,000 (F)
	7,50000	7,50000	0		88,000 (F)

6 The correct answer is: 2 only

Standard costing systems are not compatible with a Total Quality Management approach to operations. With standard costing, the aim is to achieve standard cost or, perhaps, obtain some favourable variances. With TQM, guiding principles are 'continuous improvement' and 'zero defects'. Existing standards and methods of operating are always unsatisfactory and improvements should always be sought. This is not compatible with a standard costing 'philosophy'.

Standard costing tends to be of little value in a rapidly changing environment, because products are not standardised for a sufficient length of time to make the preparation of standard costs worthwhile.

7 The correct answers are:

- It can result in much reduced inventory holding costs
- It requires suppliers to operate sound quality control procedures

The aim of JIT is to increase efficiency of inventory control systems in order to reduce company costs, principally by minimising inventory levels and thus stockholding costs. This is achieved by using local, reliable suppliers who can deliver goods of the right quality in the right quantity at the right time. The burden of quality control is generally passed back to the supplier to cut costs of the company.

JIT works best when a tied supplier relationship is formed, where the orders form a large part, if not the entirety, of the supplier's business. This precludes the use of many different suppliers. In a JIT system, steps will also be taken to improve customer relations and communications, so that demand can be more accurately determined. This means that reorder levels, and thus safety inventories, can be minimised without necessarily increasing the risks (and thus costs) of stock outs.

8 The correct answer is: Rs. 645,000 Adverse

When $Y = ax^b$, b = log 0.90/log 2 = –0.0457575/0.30103 = –0.1520031

Average labour time for first 49 batches = $2,000 \times 49^{-0.1520031}$ = 2,000 × 0.5534584 = 1,106.916731 hours

Average labour time for first 50 batches = $2,000 \times 50^{-0.1520031}$ = 2,000 × 0.5517614 = 1,103.522743

	Hours
Total labour time for first 50 units (× 1,103.522743)	55,176.14
Total labour time for first 49 units (× 1,106.916731)	54,238.92
Labour cost for the 50th batch	937.22

Standard time = 937 hours. Actual time = 980 hours.

Labour efficiency variance for this unit = 43 hours (A) × Rs. 15,000 = Rs. 645,000 (A).

9 The correct answer is: Rolling budget

A rolling budget is also known as a continuous budget.

10 The correct answer is: Sales revenue from new products as a percentage of total revenue

R&D expenditure on its own is not a measure of performance, and costs in the previous year will not relate to all four products introduced to the market in the past two years.

The most appropriate of these measures as an indication of innovation within the organisation is revenue from new products as a percentage of total revenue. (This is more meaningful for comparison purposes than simply measuring average revenue per new product.)

SECTION B

11 Labour

(1) **Planning variance caused by learning effect**

		Rs
Revised std cost for revised hours for actual output	1,827.816 hours × Rs. 70	127,947.10
Original std cost for original hours for actual output	2,400 hours × Rs. 70	168,000.00
Planning variance		40,052.90 (F)

Operational efficiency variance

		Rs
Revised std cost for revised std hours for actual output	1,827.816 hours × Rs. 70	127,947.10
Actual cost		136,500.00
Total **operational** variance		8,552.90 (A)

Workings

Average time per batch for 6 batches assuming a 90% learning curve

$Y_x = aX^b$

Where a = 400 (2,400 budgeted labour hours/6 batches)

$X^b = 6^b$ (Cumulative number of batches)

$$b = \frac{\text{Log } 0.90}{\text{Log } 2} = \frac{-0.04576}{0.301} = -0.1520$$

Therefore $6^b = 6^{-0.1520} = 0.76159$ and substituting this into the main formula for the learning curve gives

$Y_x = 400 \times 0.76159$

$= 304.636$ hours

Revised standard hours for 6 batches = 304.636 hours × 6 = 1,827.816 hours

Original standard = 2,400 hours × Rs. 7 = Rs. 16,800

Revised standard = 1,827.816 hours × Rs. 7 = Rs. 12,794.71

(2) **Differences between target costing and standard costing**

(i) **How costs are controlled**

With **standard costing**, a standard cost is set at the beginning of a specified period. Costs must be kept within this predetermined standard and variances are calculated to ensure that this is the case.

In a **target costing** system, there are no cost reduction exercises but there is **continual pressure** to ensure that costs are always kept to a minimum.

Cost reduction instead takes place at the **initial design and development stage** to ensure the desired target cost can be met.

(ii) **Time frame for cost control**

Cost control is a **continuous process** in a target costing system and target costs tend to be revised **monthly**. This ensures that costs are as **up-to-date** as possible.

In a standard costing system, standard costs are revised **annually**, meaning that actual costs are often being compared to **out-of-date** targets.

(iii) **Relationship between product concept, cost and price**

With target costing, the product concept is set and then the selling price that customers are likely to be willing to pay is established. **Target cost is determined by deducting the desired profit margin from the selling price**.

The **standard cost is established from the product concept** and the selling price is determined from this cost by adding on a desired profit margin.

(iv) **Link with strategic plans**

There is **no link** between standard costs and long-term strategies. The approach is **short-term cost control** through variance analysis.

In a target costing system, the product concept and target profit margin take into account **medium-term strategic plans** by focusing on whether the product can actually be produced for the target cost. If not, the project is abandoned in favour of a more cost-effective alternative.

12 Z

(1) **Further processing decision**

	Selling price now	*Selling price after*	*Extra variable costs*	*Contribution*
	Rs'000	Rs'000	Rs'000	Rs'000
R	30	60	14	46
S	50	57.5	9	48.5
T	35	67.5	10	57.5

Recommendations

The table shows that the further processing of products R and T into RZ and TZ will be profitable as these result in additional net revenue (that is, the contribution per unit with further processing is greater than the selling price with no further processing). Let's assume that the monthly output of product TZ remains at 1,200kg (no loss in further processing for instance). It is clear that even by accounting for these fixed costs it is profitable to convert T into TZ. So:

1,200 kg × Rs. 22,500 – Rs. 6,000,000 = Rs. 21,000,000

However, it is not profitable to process S further into product SZ. Nonetheless, other factors must also be considered. We do also need to consider whether the sales of these products are related so that, say, the sale of product T depends on that of S. So it may be necessary to continue selling a loss-making product to maintain a market presence.

(2) **Validity of the common process**

(i) Assuming an external market for products R, S and T

We are considering the **validity of the common process**. So we need to compare the combined cost of producing the three products with the combined market prices for each as given in the question.

	Product			
	R	*S*	*T*	*Total*
Revenue	Rs'000	Rs'000	Rs'000	Rs'000
R/S/T (W1)	24,000	100,000	42,000	166,000
Cost (W2)				175,000
Net revenue/loss				(9,000)

Working

(1) Take the output from the common process for each product and multiply by the unit market prices given. So for product R, this would be 800kg × Rs. 30,000/kg.

(2) Total cost taken from process account in question.

Recommendation

The calculations in the table tell us that the common process is not viable given the costs and/or current market prices for the products.

(ii) Assuming no external market for products R, S and T

We need to work out a **notional sales value** for each product if there isn't a market price. This can be achieved by working backwards from the further products which do have a sales value.

	Product			
	RZ	*SZ*	*TZ*	*Total*
Revenue	Rs'000	Rs'000	Rs'000	Rs'000
RZ/SZ/TZ (W1)	48,000	115,000	81,000	244,000
Common costs				175,000
Further costs (W2)	11,200	18,000	18,000	47,200
Net revenue/loss				21,800

Workings

(1) Take the unit market prices in the question and multiply by the outputs from the common process. So taking product R/RZ, 800kg × Rs. 60,000/kg = Rs. 48,000,000.

(2) Take the output from the common process and multiply by the specific costs in the question. Remember to include the fixed costs relating to product TZ.

Recommendation

The calculations in the table tell us that the common process is viable given the costs and/or notional market prices for the products. However this does of course depend on how reliable the notional prices are in reflecting market prices for the products.

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Division A

Return on investment (ROI):

Net profit = Rs. 44.6m × 28% = Rs. 12.488m
ROI = (profit / capital employed) × 100%
= Rs. 12.488m / Rs. 82.8m = 15.08%

Residual income (RI):

Net profit = Rs. 12.488m
Capital employed = Rs. 82.8m
Imputed interest charge = Rs. 82.8m × 12% (cost of capital for both divisions) = Rs. 9.936m
RI = net profit – imputed interest charge
= Rs. 12.488m – Rs. 9.936m = Rs. 2.552m

Division B

Return on investment (ROI):
Net profit = Rs. 21.8m × 33% = Rs. 7.194m
ROI = Rs. 7.194m / Rs. 40.6m = 17.72%

Residual income (RI):

Net profit = Rs. 7.194m
Capital employed = Rs. 40.6m
Imputed interest charge = Rs. 40.6m × 12% = Rs. 4.872m
RI = Rs. 7.194m – Rs. 4.872m = Rs. 2.322m

Comments

The current return on investment (ROI) of each division is 16%. It is likely that the manager of Division A will reject any proposal based solely on ROI as the Division A investment only has a ROI of 15.08%. The proposed investment would reduce Division A's ROI by 0.92 percentage points.

In contrast, the manager of Division B is likely to accept the proposal as the Division B investment has an ROI of 17.72%. The proposed investment would increase Division B's ROI by 1.72 percentage points.

Both divisions are likely to accept the proposal based on residual income as both have a healthy RI (Rs. 2.552m and Rs. 2.322m respectively).

The views of the new manager of Division A are correct. The use of ROI as the sole decision tool in the past has led to a lack of goal congruence between Division A and the company as a whole.

It is clear that the use of RI as an investment measure will help the divisions to make decisions that are in the best interests of the company.

14 DH

In the case of this cash surplus the issues are as follows:

1 This cash is needed to **pay for the factory**. Therefore the risk of loss must be minimised, even at the cost of lower returns during the period of investment.

2 The cash will be needed in **3–4 months**. Therefore it cannot be tied up for a longer period.

I have looked at the three possible investment opportunities and found the following:

(i) **Treasury bills.** These are virtually risk free and have an annual yield of 4% (1% over 3 months × 4). Purchased now and held for 91 days, they will give us a return of 1% over the three months.

(ii) **Equities** are higher yield (10%) but with a far higher level of risk. We have no way of knowing how the share index will perform over three months and we may end up selling at a loss in order to release the cash. If the shares are sold before the dividend is declared we will lose the dividend.

(iii) **A bank deposit account** will pay 3.5% per annum. This is slightly less than Treasury bills but is also virtually risk-free and only requires 30 days' notice. If notice is not given, a month's interest will be lost.

The best option would appear to be the Treasury bills for 91 days. If at the end of that time the cash is not needed for another month it could be put into a bank deposit account.

SECTION C

15 Budgetary control

(1) Advantages and disadvantages of allowing profit centre managers to participate actively in the setting of the budgets for their units.

Main advantages of participation are as follows:

(i) **Acceptance and commitment**

If profit centre managers participate in setting the targets they are more likely to accept these and show more commitment towards achieving them

(ii) **Narrowing the knowledge and information gap**

The detailed knowledge of day to day operations that profit managers have will enable more effective and relevant targets to be set. This process of information sharing will lead to the setting of optimal targets, taking into account both organisational and operational constraints and opportunities and making variance analysis more meaningful

(iii) **Motivation and improved performance**

Research findings confirm that participation increases job satisfaction, improves work related attitudes and leads to better performance.

Potential disadvantages of participation

(i) **Time**

The process of participation may be more time consuming in some circumstances participation may lead to less difficult targets or the introduction of budget slack

(ii) **People's reaction**

Research has shown certain people to react better to an imposed budget.

(2) (i) **Four perspectives of a balanced scorecard**

The balanced scorecard is an approach to performance management that provides information management that provides information on a set of different indicators both financial and non-financial.

The scorecard is referred to as 'balanced' in the sense that managers are required to think in terms of four different perspectives, to prevent improvements being made in one area at the expense of the another. The perspectives are financial, customer, internal business and innovation and learning.

(ii) For a general insurance company the following are appropriate performance measures for each perspective:

Financial perspective

- Sales growth compared with previous periods or across the industry
- Market share (measured quarterly as a %)

Customer perspective

- New customers acquired on a monthly basis
- Customer complaints as a % of total customer base

Internal business perspective

- Speed of producing management information such as details of outstanding claims
- Despatch time for new policies

Innovation and learning perspective

- Staff training hours per year
- Staff turnover (%)

(3) Circumstances where participation in budget setting is likely to contribute to **poor** performance by managers (only three required)

(i) Participative budgets can be very time consuming and tend to result in a complex, prolonged and costly budgetary process.

(ii) Participative budgets may lead to budget slack or budget bias where targets are deliberately set at a lower level so that they can be easily achieved or exceeded. This would lead to lower targets and sub-optimal performance and underachievement disguised as meeting expectations.

(iii) Budgets may be inappropriate if managers are not qualified to participate.

Other points you may have made include:

(i) In a stable market environment especially where cost centres are not required to respond to fast moving market conditions participation may result in few or no benefits.

(ii) Participation may be counterproductive where employees feel they have no real influence but merely a semblance of participation.

(iii) Some employees respond better to imposed budgets.

16 Electrical appliances

(1) (i) **Selling price for product K to maximise contribution during the maturity stage**

Selling price / unit (Rs '000)	100	85	80	75
Contribution / unit (Rs '000)	62	47	42	37
Demand (units)	600	800	1,200	1,400
Contribution (Rs '000)	37,200	37,600	50,400	51,800

From the above table it is clear that a selling price of Rs. 75,000/unit maximises contribution for Product K.

The company production facility has a capacity of 2,000 hours per week. 1,400 units of Product K will take 1,400 hours to produce (standard production time of 1 hour per unit). This leaves 600 hours remaining to produce Product L.

Production of Product L takes 1.25 hours per unit. Therefore the maximum number of units of Product L that can be produced in a week is 480 units.

(ii) **The selling price of product L during the growth stage**

When demand is linear the equation for the demand curve is P = a – bx

Where P = the selling price

x = the quantity demanded at that price

a = theoretical maximum price. If price is set at 'a' or above, demand will be zero

b = the change in price required to change demand by one unit

a and b are constants and are calculated as follows:

$$a = \text{Rs}(\text{current price}) + \left(\frac{\text{Current quantity at current price}}{\text{Current quantity when price changed by Rs. b}} \times \text{Rs. b} \right)$$

$$b = \frac{\text{Change in price}}{\text{Change in quantity}}$$

Step 1 **Find the price at which demand would be nil**

The question states that there is a linear relationship between the selling price of the product and the number of units demanded. Therefore, each increase of Rs. 10,000 in the price would result in a fall in demand of 200 units. For demand to be nil, the price needs to rise from its current level by as many times as there are 200 units in 1,000 units (expected demand per week for the product).

(1,000,000/200 = 5,000) ie to Rs. 100,000 + (5 × Rs. 10,000) = Rs. 150,000.

Using the formula above, this can be shown as a = Rs. 100 + ((1,000/200) × Rs. 10)= Rs. 150,000

Step 2 **Calculate b**

$$b = \frac{\text{change in price}}{\text{change in quantity}} = \frac{\text{Rs.}10{,}000}{200} = 50$$

The demand equation is therefore P = 24,000 – 50x

Where x represents the quantity demanded. We know from part (1)(i) that the maximum level of production for Product L is 480 units a week.

Step 3 **Complete the equation**

P = 150,000 – 50x
P = 150,000 – 505 × 480 units)
P = 150,000 – 24,000
P = 126,000

Product L should be sold for Rs. 126,000 per unit at the growth stage.

(2) **Penetration pricing**

Penetration pricing is a policy of **low prices** when the product is **first launched** in order to obtain sufficient penetration into the market.

Product M is an innovative product that the manufacturer believes will change the whole market once it is launched. A strategy of penetration pricing could be effective in **discouraging potential new entrants** to the market.

However, the product is believed to be unique and as such **demand** is likely to be fairly **inelastic**. In this instance a policy of penetration pricing could **significantly reduce revenue** without a corresponding increase in sales.

Market skimming

Market skimming pricing involves charging **high prices** when a product is **first launched** and spending heavily on **advertising and sales promotions** to obtain sales.

The aim of market skimming is to **gain high unit profits early in the product's life**, allowing the costs of developing the product to be recovered.

Product M is new and different. A policy of market skimming appears most appropriate as customers are prepared to pay high prices for innovative products that are expected to change the market.

(3) **Unit production costs**

Unit production costs of Product M are likely to change throughout the product's life cycle.

Production costs at the growth stage

The impact of **learning and experience curves** is likely to result in a reduction in production costs per unit at the growth stage. Costs may also decrease due to **economies of scale**.

The extent to which costs fall will depend upon the **skill level** and **experience** of the workforce and the complexity of the manufacturing process.

Production costs at the maturity stage

The workforce is likely to have become used to the manufacturing process by the maturity stage. The **learning period** will have ended and production costs per unit are likely to remain fairly constant.

Production costs at the decline stage

Sales volumes at the decline stage are likely to be low as the product is **surpassed by new exciting products** that have been introduced to the market. Furthermore, the workforce may be less interested in manufacturing a declining product and may be looking to learn new skills. For both of these reasons, **unit production costs are likely to increase** at the decline stage.

Unit selling price

The selling price will initially be high if a policy of **market skimming** is employed. The uniqueness of the product should **justify the high selling price** and will enable the company to quickly **recoup product development costs**.

Selling price at the growth stage

The high selling price will encourage competitors to attempt to produce the same product at a lower cost. Competitors may attempt to do this through **reverse engineering**.

The company should **reduce the selling price** at the growth stage to maximise unit sales as the product is more affordable to lower social economic groups.

Selling price at the maturity stage

It is likely that the price of the product will be lowered further at the maturity stage in a bid to **preserve sales volumes**. The company may attempt to preserve sales volumes by employing an **extension strategy** rather than reducing the selling price. For example, they may introduce product add-ons to the market that are compatible with Product M.

Selling price at the decline stage

At the decline stage, Product M is likely to have been **surpassed by more advanced products** in the market and consequently will **become obsolete**. The company will not want to incur **inventory holding costs** for an obsolete product and is likely to sell Product M at **marginal cost or perhaps lower**.